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Income Distribution and Inequality in Canada

By Roger Love



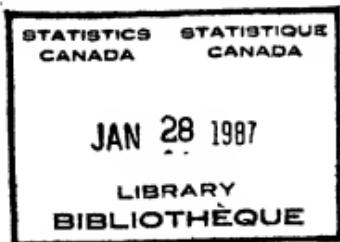


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Census Analytical Study

Income Distribution and Inequality in Canada

By Roger Love



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FOREWORD

The Canadian censuses constitute a rich source of information about the condition of groups and communities of Canadians, extending over many years. It has proved to be worthwhile in Canada, as in some other countries, to supplement census statistical reports with analytical monographs on a number of selected topics. The 1931 Census was the basis of several valuable monographs but, for various reasons, it was impossible to follow this precedent with a similar program until 1961. The 1961 Census monographs received good public reception, and have been cited repeatedly in numerous documents that deal with policy problems in diverse fields such as manpower, urbanization, income, the status of women, and marketing. They were also of vital importance in the evaluation and improvement of the quality and relevance of Statistics Canada social and economic data. This successful experience led to the decision to continue the program of census analytical studies. The present series of analyses is focused largely on the results of the 1971 Census.

The purpose of these studies is to provide a broad analysis of social and economic phenomena in Canada. Although the studies concentrate on the results of the 1971 Census, they are supplemented by data from several other sources. These reports are written in such a way that their main conclusions and supporting discussion can be understood by a general audience of concerned citizens and officials, who often lack the resources needed to interpret and digest the rows of numbers that appear in census statistical bulletins. For these persons, interpretive texts that bring the dry statistics to life are a vital dimension of the dissemination of data from a census. Such texts are often the only means that concerned citizens and officials have to personally perceive benefits from the national investment in the census. This particular report is one of a series planned to be published concerning a variety of aspects of Canadian life, including income, language use, farming, family composition, migration, adjustment of immigrants, human fertility, labour force participation, housing, commuting and population distribution.

I should like to express my appreciation to the universities that have made it possible for members of their staff to contribute to this program, to authors within Statistics Canada who have freely put forth extra effort outside office hours in preparing their studies, and to a number of other members of Statistics Canada staff who have given assistance. The Social Science Federation of Canada has been particularly helpful in the selection of authors for some of the studies, and in arranging for review of several manuscripts. In addition, thanks are extended to the various readers, experts in their fields, whose comments were of considerable assistance to the authors.

Although the monographs have been prepared at the request of and published by Statistics Canada, responsibility for the analyses and conclusions is that of the individual authors.

PETER G. KIRKHAM,
Chief Statistician of Canada

PREFACE

The original objective of the present study was to analyze the changes in income inequality between 1960 and 1970 using the rich data base that the 1961 and 1971 Censuses provided. Much preparatory effort was required to reorganize the data into consistent sets so that coverage, conceptual and definitional differences would not confound the comparison.

In spite of these efforts, it became apparent that difficulties with the data were such that no authoritative comparative analysis could be produced (an explanation is provided in Appendix A). Instead, the study concentrates on a detailed examination of the inequality in the Canadian income distribution of 1970 and attempts to look at its component parts. The concern about inequality in the income distribution stems from the fact that money income received by Canadians represents one of the most important means to satisfy needs and wants.

In the production of this report there was a great deal of background work and other associated tasks without which the report would not have been completed. This involved a number of persons whose assistance I would like to gratefully acknowledge. They are (in alphabetical order), Judi Benbow, Marie Deslauriers, Lise Jérôme, Joyce Lam, Gail Oja, Frank Perks, Jenny Podoluk, Abdul Rashid, Peter Sherhols, Brian Sim and Henri Simon.

Further, assistance from the staff involved in coordinating the Census Analytic Studies Programs, reviewers and editors is greatly appreciated.

I assume, of course, responsibility for any errors or blemishes that may appear therein.

Roger B. Love,
Ottawa, 1978.

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INTRODUCTION

Studies of the Canadian income distribution had a slow start in the postwar era but have now become a popular topic in socio-economic research. Measuring the income distribution by size started in 1951 as an adjunct to the then maturing national accounts estimates. The first sample survey of households taken in 1952 and collecting data for 1951 was designed to approximate the national accounts personal income concept as closely as possible. After two decades of occasional household surveys, the Survey of Consumer Finances became annual in 1971.

Considerable public discussion, some of it in the daily press, has taken place on the subject of whether income inequality has increased, decreased or stayed the same. There seems to be some difficulty in interpreting changes that appear in annual data produced from the surveys of consumer finances by Statistics Canada. The problems are partially due to the limited analysis that can be done with survey data based on small samples, but it is also difficult to maintain a longer historical perspective by using data that are affected by random short-term fluctuations. Census data offer an opportunity to examine the income distribution in some detail as the sample size is unequalled by any other data source. Such data also provide information on a substantial number of socio-economic variables that are indispensable for a meaningful analysis.

Historically, questions covering all money income components appeared first in the 1961 Census; prior to that, only data on wages and salaries had been obtained on census questionnaires. The 1961 Census data provided the base for a widely used income monograph that has since gained recognition as a definitive description of the income distribution of the early 1960's in Canada (see Podoluk, 1968).

There are no prescribed rules on the most important aspects of the income distribution. Analysis of the extremes of the income distribution, the rich or the poor, highlights only specialized parts of the distribution. In this report, no one segment of the income distribution is emphasized but the existing and changing shape of the entire distribution is the focus of attention. Consequently, those persons interested in the extremes of the distribution may find little to whet their appetite simply because these issues are not emphasized in this report.

The concentration on describing and analyzing the entire distribution, although of inherent interest to an economist, can be justified on the premise that the distribution of personal income by size (which is much broader than the money income concept defined for this report) is also an important public concern and says something about the level and distribution of economic well being in society¹ and, more importantly, about the equity of society. However, there are different opinions about what is an equitable distribution of income. In

See footnote(s) on page 17.

the traditional Lorenz curve analysis, the 45° line representing equal incomes for all is sometimes assumed to be equitable but could be very inequitable. In any case, there is general agreement that certain aspects of the income distribution are important and that a tracking or monitoring of the income distribution effects of public policy is an important piece of social and economic information.

Although there is a consensus that the distribution of personal income is an important concern, there is less agreement about the importance of the distribution of **money income** which falls short of the comprehensive concept of income defined by economists where personal income may be defined as (i) the sum of the market value of rights exercised in consumption, and (ii) the change in the store of property rights between the beginning and end of the period, H. Simon, 1938 (this issue is explored in Chapter 1). These theoretical inadequacies of the money income concept may result in false conclusions about the level or changes in the distribution of income (comprehensively defined).

Money income excludes all public and private non-cash transfers, net benefits from government services, realized or unrealized capital gains, and other fringe benefits not received in the form of cash.

At this stage, there are two possible approaches:

- (a) adjust the money income distribution to reflect the excluded income components; and
- (b) proceed with the money income distribution as defined in the census.

Ideally, the first approach is obviously superior and would be more meaningful but adequate data do not exist to make the required adjustments. These adjustments, if made, would be subject to much discussion because of their controversial nature.

Instead, the second approach has been chosen knowing fully well its theoretical inadequacies. However, it does have the advantage of being a reasonably objective and concrete concept about which there is little confusion as to what is measured.

A major part of this report examines money income variations in 1970 and assesses the importance of a selected group of socio-economic characteristics in relation to the shape of the income distribution. No attempt is made to examine these variables from a welfare point of view. For example, if income inequality is found to be highly correlated to income differences by age of the family head, there is no judgement as to whether or not these differences are justified and should be "allowed". In fact, one may find certain differences that appear to be insignificant in aggregate but intolerable in practice – the economic plight of a very small town, for example.

It can be argued that the current state of the income distribution can only be examined in light of how it is changing over time. This means an explicit goal

that over time inequality should be increasing or decreasing (depending on one's conviction). The current notion is that the result of many programs the government has introduced should be less income inequality. However, it is thought that there are countervailing demographic forces that may reflect themselves in an increase in observed inequality. (For example, how do changes in the age distribution, and the family size distribution affect the observed level of income inequality?) In this report, an attempt is made to standardize inter-temporal comparisons of the money income distribution for these changing characteristics.

However, it may be that the money income concept is inappropriate to examine these issues. If one views money income as one important component of the income distribution, then an explanation of variations in money income adds substantially to understanding the distribution of income. This approach is the only way that one can rationalize using census data to provide insights into these important problems.

The material in the study is organized as follows:

Chapter 1 provides a discussion of concepts and techniques that are basic to measuring income inequality. Much confusion and misunderstanding have been generated by lack of recognition that basic concepts such as the income definition, the measure of inequality used and the universe for which data are presented have an important bearing on the results of the analysis.

Chapter 2 discusses the differences that the unit of analysis makes, e.g., analyzing data on economic family definition versus other concepts of recipient units. It also provides a general description of the 1970 income distribution by showing the composition of the different income deciles in terms of a number of characteristics.

Chapters 1 and 2 together provide a statistical framework within which one can describe the income distribution in comparable ways across time and space as a prelude to investigating the more interesting substantive issues. Depending on interests and backgrounds of the reader, these two sections may be skipped, although the technical material supplied in these sections is important in understanding the subsequent discussion.

Chapter 3 introduces standardization as a method of isolating and quantifying the effect of different variables on the overall inequality. First, income inequality measures are presented for different groups of family units (e.g., inequality in each province). These are measures of "within" group inequality. By eliminating "between" group differences, standardized distributions and inequality measures are produced; first simple and later multiple standardizations are performed resulting in a ranking of variables in terms of their statistical contribution to overall inequality.

Chapter 4 attempts a partial historical comparison of the Canadian income distribution in 1960 and 1970. Due to data problems, no "within" group inequality can be compared. Adjustments for population shifts and differences in mean incomes are made resulting in only a few clear-cut conclusions, e.g., changes in family size, sex and age of head have had a disequalizing effect on the income distribution. For the rest of the variables no consistent results emerge.

Conclusions for the four chapters of the study are summarized after Chapter 4.

Appendix A evaluates the income data from the 1961 and 1971 Censuses. Difficulties with the 1961 data are analyzed. For purposes of measuring and standardizing inequality, the quality of the 1960 data is judged to be inadequate.

Appendix B presents five tables that show decile shares of income and corresponding inequality measures for different recipient units to illustrate the discussion in Chapter 2.

Appendix C contains nine tables that show decile cut-offs and income shares for the variables that are used in the standardizing exercise in Chapter 3.

FOOTNOTES

¹ An example of this importance in Canada has been noted in Research Report No. 4, *The Distribution of Income in Canada: Concepts, Measures, and Issues*, Health and Welfare Canada. "Finally, there has been a change in people's expectations regarding the rate of economic growth that can be sustained in the future. With the prospect of smaller increases in income, families at all income levels have become more aware of changes in their relative income position and the increases in tax burden implied by new government initiatives. As a result, there has been some shift in the focus of attention away from distributional issues relating to poverty toward more general questions of equity in the distribution of income and the incidence of taxation."

Further, it is difficult to talk about questions of poverty and extremely high incomes without knowing the shape of the existing distribution and applying policies directed toward rich or poor will have impacts on the other parts of the distribution.

CHAPTER 1

INCOME DISTRIBUTION CONCEPTS

This chapter discusses the basic tools for describing the distribution of income (Section 1.1) and the definitions of concepts as used in this report (Section 1.2). This discussion lays the ground work for the analysis in the remaining parts of the report. Section 1.3 describes the sources and methods.

1.1. The Basic Tools – The Summary Distribution and Lorenz Curves

The raw data of the income distribution are presented as a list of the incomes of the recipient units (recipient units can be defined in many ways as discussed in Section 1.2). These units can be ordered by the income size, which creates a list of individuals from the lowest to highest income. This list, although providing all detailed information and being the most complete description of the income distribution, is not a very useful way to present the distribution of income because of its great length and detail. The income distribution is usually summarized by one or more methods which emphasize different aspects. The most common method of summarizing the income distribution is the frequency distribution that groups the population into classes by size of income and gives the number or proportion of recipient units in each income class. A graph of the frequency distribution¹ is a good way to portray the essence of the income distribution for most purposes. However, for some purposes the usual frequency distribution is not the best way to describe the income distribution. This is especially true for examining income inequality where the important aspect of the income distribution is the share of income received by population groups. A descriptive method of presenting the income distribution which emphasizes the income shares is by using quantile information which is usually summarized in the form of quintiles, deciles or percentiles. The population is divided into groups of equal size (five, 10 and 100 groups corresponding to quintiles, deciles and percentiles respectively) after they are ranked according to income. Then for each equal size group the proportion of income is given. For example, the decile income distribution gives the proportion of income received by 10 equal sized groups of the population starting with the 10% of the population with the lowest incomes and ending with the 10% of the population with the highest incomes.

Table 1.1 presents a hypothetical frequency distribution and a hypothetical decile income distribution (as to terminology the text uses decile distribution rather than the longer decile income distribution). The frequency distribution gives the proportion of units in each income class and the decile distribution gives the proportion of income (or income shares) for 10 equal sized groups of the population ranked according to income. The decile distribution, although it does

See footnote(s) on page 32.

not contain information about the income levels relating to each decile, is a superior presentation for answering questions such as "who receives what", i.e., the lowest 10% of the population receives only 1% of the income compared to 25% for the richest 10%. In other words, questions of income inequality are concerned with relative income shares of recipient units and are best observed by quantile shares.

TABLE 1.1. Hypothetical Frequency and Decile Distributions

Income class	Frequency	Decile class	Income share
	per cent		per cent
Total	100.0	Total	100.0
Under \$1,000	6.0	Lowest	10.0
\$ 1,000 - \$ 1,999.	10.0	2nd	1.5
2,000 - 5,999.	12.0	3rd	3.2
6,000 - 8,999.	20.0	4th	7.5
9,000 - 14,999.	22.0	5th	9.6
15,000 - 24,999.	20.0	6th	10.1
25,000 and over	10.0	7th	12.6
		8th	14.3
		9th	16.3
		Highest	24.9

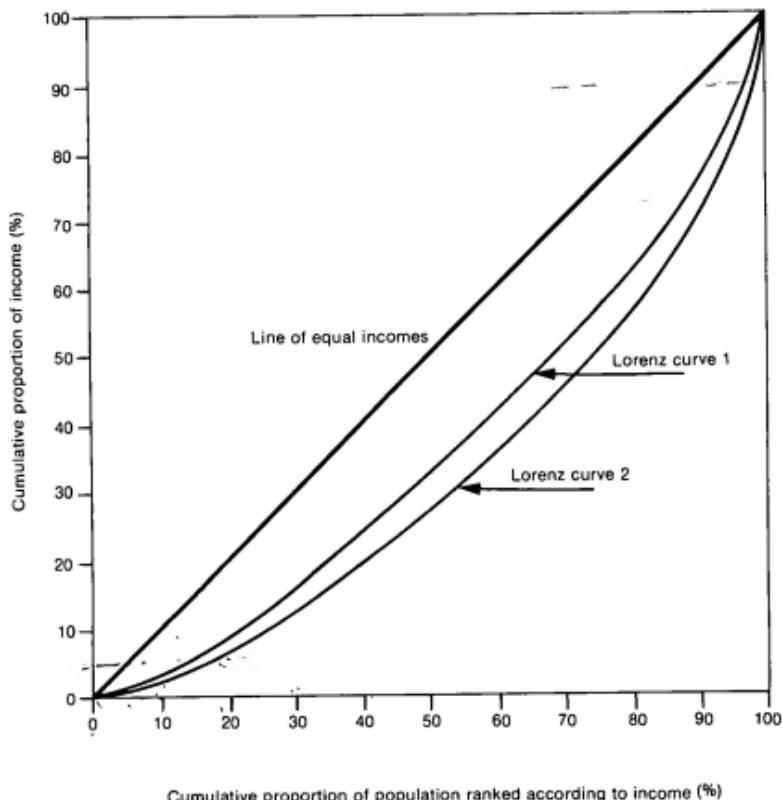
In theory, neither one of these distributions is better than the other because one can move from one to the other mathematically if the underlying population follows exactly some defined frequency distribution. In practice, however, each method of presentation has its advantages and disadvantages that must be considered in light of the analytic purpose at hand. One advantage of the quantile summary has already been described. Another advantage is its usefulness in comparisons over time — it is much easier and more meaningful to compare respective tenths or fifths of the population over a period of time than it is to compare groups in the same absolute income class because of price changes and growth that may have occurred over the period, which brings into question the comparison of both current and constant dollar distributions.

1.1.1. The Lorenz Curve

A convenient and helpful method of summarizing the income distribution is the Lorenz curve that plots the cumulative proportion of income against the cumulative proportions of the income recipients. At each point on the curve, the proportion of income received by the lowest X% of the population is given. For example, the lowest 10% of the recipient units may have 2% or 3% of aggregate income. (This curve is easily derived from the decile distribution — the cumulative shares of the population are 10%, 20%, . . . , 100%, and the cumulative income shares are found by accumulating the income shares.) Two illustrative Lorenz curves are presented in Chart 1.1.

Chart — 1.1

Two Hypothetical Lorenz Curves



Lorenz curves always have the following two characteristics:

- (a) they always lie below the 45° line (with negative incomes they lie below the horizontal axis); and
- (b) they are always concave to the 45° line (because lower groups always have a less than proportionate share of income).

There are two limiting cases to the Lorenz curve:

- (i) when everyone has the same income it is equivalent to the 45° line (lowest 10% has 10% of income, lowest 20% has 20% of income, etc.); and
- (ii) when one person has all the income, it follows the horizontal axis to 100% at which time the vertical axis becomes 100%.

Lorenz curves can be used to compare the degree of inequality between two or more distributions over time or across different characteristics (i.e., age, sex, etc.). If the Lorenz curve for one distribution is completely inside the other (as for Lorenz curve 1 in Chart 1.1), then this distribution is more equal in the sense that income shares in the lower deciles are greater than those in the other distribution. In cases where the one Lorenz curve is not completely inside the other, the "crossing Lorenz curve" phenomenon occurs; for example, in one distribution the shares of the middle deciles may be greater but the shares in the lower and higher deciles may be less when compared to another distribution. In this case, it is necessary to compare a distribution that is less at the top (more equal) and also at the bottom (less equal) before making a judgement about whether the distribution is less or more equal. In any case, the concept of "more equal" becomes vague in this situation.

Quantitative training drives one to proceed even further from the Lorenzian graphic description of inequality to a more precise statistical measurement of inequality so that one may say, for example, inequality at 0.38697 in 1970 had increased by 12% since 1960. Once quantified in this manner, the concept seems much more concrete and all the mystery seems to have disappeared which, of course, is not true. As we shall see, there are many possible measures of inequality, all of which say different things about levels of inequality and changes in it. (This complex issue is discussed in greater detail in Love and Wolfson, Appendix 3.)

Inequality measures will be discussed further in the next section but there is one common measure, the Gini coefficient, which is so closely associated with the Lorenz curve that it warrants discussion at this point. The Gini coefficient expresses the area between the diagonal and the Lorenz curve as a proportion of the total area under the diagonal. As the Lorenz curve deviates further from the diagonal, the Gini coefficient becomes larger and it varies between zero (representing equality of income) and one (the situation where one income unit has all the income) and is thus ideally suited as a summary measure of the degree

of inequality for comparison over time and place.² However, in cases where the Lorenz curves cross and the direction of change in inequality is uncertain, the Gini coefficient values may be misleading. Defining the measure of inequality is quite complex and it is discussed on an intuitive basis in Section 1.2. At this time, it is sufficient to say that the inequality measure is a useful analytic and summary tool without which little meaningful analysis is possible.

One should bear in mind that any quantitative results in terms of a particular inequality measure are only suggestive. For example, in answer to a question about inequality in relation to age, one can say that age appears to be strongly related to inequality and that relative to other variables age is more or less important. A qualitative statement based on some quantitative evidence is a more meaningful statement than one without such support.

1.2. Conceptual Issues Relating to the Measurement of Income Distributions and Inequality

Section 1.1 outlined the basic tools of analysis without applying any substance to the important concepts such as the recipient unit and the income concept. This section discusses some of these concepts and the ways they are used in the analysis. In many cases, these choices are dictated by the available data and what is ideal in terms of a concept for making welfare judgements is generally not available. Consequently, analytic conclusions must always be conditioned to what is being actually measured and not necessarily applicable to what one would ideally want to measure for welfare comparisons — in this sense the analysis is only partial.

The important statistical concepts are:

- the income concept;
- the recipient unit;
- the time period of measurement;
- the ordering principle;
- grouping bounds; and
- the inequality measure.

The interpretation of income distribution data is dependent on the choice of the underlying concepts. More importantly, substantive interpretation of the data requires general acceptability of the chosen concepts. Differences over time and place may reflect different statistical treatment of these concepts; for example, in time series analysis one can easily obtain erroneous conclusions on inequality trends if inequality measures calculated for different recipient unit

See footnote(s) on page 32.

concepts are compared. Similarly, something as trivial as differences in the fineness of the data base used for calculating the inequality measures (the grouping bounds issue) can distort the results.

1.2.1. The Income Concept

In this analysis, income is equivalent to the definition incorporated in the 1971 Census of Canada in which persons 15 years of age and over were asked to report money income during the calendar year 1970 from each of the following sources:³

- wages and salaries;
- net income from non-farm self-employment;
- net income from farm operation;
- family and youth allowances;
- government old age pensions, Canada pension and Quebec pensions;
- other government transfer payments;
- retirement pensions from previous employment;
- bond and deposit interest and dividends;
- other investment income; and
- other income.

Total income is the sum of the 10 components.

The appropriate income concept depends very much on the purpose at hand but from the point of view of valid comparisons of income differentials between socio-economic groups, all items that represent potential command over goods and services should be counted as income. On the basis of this definition, the income concept is not as comprehensive as one would like in that fringe benefits, income in kind, imputed income, and capital gains are excluded while taxes, direct and indirect, have not been deducted from the income. This treatment will obviously condition the analysis as to true differences in income. However, the sheer magnitude of money income suggests that any differences that it shows will be reflected in total inequality. Alternatively, one can treat this as an analysis of differences in a major component of income but not of "total" income which would include more adjustments to the income concept.

1.2.2. The Recipient Unit

Income flows to recipient units and income differences between these units depend on how the recipient unit is defined. For example, should an elderly father with a low income but living with his son who has a high income be considered a separate recipient unit? This very much depends on how it is felt

See footnote(s) on page 32.

that the recipient unit should be defined. The definition of the appropriate family unit has evoked considerable debate in academic and policy circles. It has been argued that measured inequality could increase because of a decision of low-income individuals to form their own households as a result of increased benefits received through government programs — for example, an increase in old age security payments may result in a rise in the number of low income elderly families with a consequent increase in measured inequality. Whether this should be considered an important increase in inequality is the question. In order to provide some insight into this topic and show the effect of the recipient unit definition, the analysis in this report includes families defined on a more restrictive basis than usually presented in Statistics Canada publications.

The most common family concept is that of the census family that consists of a husband and wife (with or without children who have never been married, regardless of age) or a parent with one or more children never married, living in the same dwelling. A family may consist, also, of a man or woman living with a guardianship child or ward under 21 years for whom no pay was received.⁴

In census terminology, persons living alone and those living with related or unrelated individuals but not in a husband-wife or parent-unmarried child relationship are called non-family persons.

Another family concept is that of the economic family consisting of a group of two or more persons living together and related to each other by blood, marriage, or adoption.

Persons who are not related by blood, marriage or adoption to any other member of the household in which they reside are called persons not in economic families (or unattached individuals).

The third family concept, one that is not generally used in Statistics Canada publications, is that of the restricted census family that is defined similarly to the census family except that any sons or daughters 18 years of age and older are considered persons not in restricted census families.

In this report families and persons not in families are analyzed collectively most of the time. When this is the case, the term family unit is used. Thus, persons not in families constitute a family unit of size one that will sometimes be called an unattached individual.

For convenience, these units are sometimes referred to as EF (for economic families), CF (for census families) and RCF (for restricted census families).

As well as presenting income distributions for these different family concepts, individuals 15 years of age and over, with or without money income, are used as examples of recipient units.

See footnote(s) on page 32.

1.2.3. The Time Period of Measurement

The time period of measurement, an integral part of the income definition which is defined as a flow over a given time period, is important enough to warrant a separate discussion in studies of income distribution and inequality. In this report, the standard calendar year is used as the reporting period. This period is long enough to cancel out minor income fluctuations that are not important sources of income inequality.

Longer time periods have been recommended since during a year recipient units are at different stages of the life cycle and so we expect their incomes to be different. In this discussion, we are not primarily interested in controlling the life cycle influences in this manner but attempt to recognize this problem by including age of family head as a variable in the analysis.

1.2.4. The Ordering Principle

The ordering principle states the rule for ranking recipient units so that the distribution and the degree of inequality can be described. Ideally, the ordering principle should allow all families or individuals to be ranked on the basis of a common *numéraire* which allows a comparison of families of different sizes and composition. Unfortunately, no generally accepted principle exists. Recipient units are generally ranked by the size of their income. This procedure is not fully satisfactory for the purpose of this report; however, used with care it can provide insights into the inequality question. This ranking method has the advantage of being fairly objective, easily understood and accepted, which is not true of some of the alternative procedures.

There have been attempts to approximate a more realistic ordering principle by using income per capita or a welfare ratio (recipient unit income divided by the poverty line for the recipient unit). These are examples of specific adult equivalent scales. The approach taken in this report is to: (i) treat family income as the ordering principle; (ii) provide supplementary information using other ordering principles; and (iii) analyze the data in light of weaknesses in the family income concept (i.e., treating family size explicitly as a variable in the analysis and doing separate analyses for each family size).

1.2.5. Grouping Bounds

Generally, inequality measures are subject to grouping bounds since summary statistics are usually calculated from grouped data by income class. This error has been minimized by using a large number of income classes in the calculation of the various summary measures (94 income classes).

1.2.6. The Inequality Measure

The purpose of an inequality measure is to provide a single number that can be used to describe the nature of income differences. Ideally, one should be able to use the measure to see whether or not inequality is changing.

One measure of inequality, the Gini coefficient to which reference has been made, has great popularity due mainly to its easy geometric interpretation. However, it is only one of many statistical measures that one can use to measure inequality.

To narrow down the possible large range of inequality measures, an attempt has been made to specify desirable conditions that inequality measures should satisfy. Unfortunately, this list of generally acceptable axioms, although limiting the number of inequality measures, does not reduce them to a manageable number. However, this list of conditions does provide a framework within which inequality measures can be evaluated — if a measure does not satisfy the conditions on the list, the measure can be thrown out with a reasonable degree of confidence.⁵

These conditions are:

Anonymity — The inequality measure is independent of the characteristics of the persons receiving the income.

Mean independence — Increasing all incomes proportionately leaves the inequality measure unchanged.

Population independence — The inequality measure is independent of the size of the population.

Condition of transfer — A transfer of income from a richer to poorer person, without changing their order, reduces inequality.

Continuity — Small changes in income result in small changes in the inequality measure.

Several popular measures of inequality do not satisfy some of these conditions — the variance of logarithms does not satisfy the condition of transfers and the variance is not mean independent. This suggests they are poor measures of inequality.

The condition of transfer is especially useful in eliminating inequality measures that do not use the income information on all individuals — for example, the ratio of the highest income to the lowest income will not be affected by any transfers of income between the two extremes.

See footnote(s) on page 32.

Of the popular measures, three have been chosen for presentation – the Gini coefficient, the Theil-Bernoulli coefficient (T - B) and the coefficient of variation (C.V.). The respective mathematical expressions are:

$$\text{Gini coefficient} = \frac{\sum_{i=1}^N \sum_{j=1}^N |y_i - y_j|}{2N^2\mu}$$

$$\text{T - B coefficient} = - \frac{1}{N} \sum_{i=1}^N \log \left(\frac{y_i}{\mu} \right)$$

$$\text{Coefficient of variation} = \frac{\frac{1}{N} \sqrt{\sum_{i=1}^N (y_i - \mu)^2}}{\mu}$$

where y_i , y_j are the incomes of the i th and j th individuals, μ is the mean income, and N the population size.

For each of these measures small values are associated with low inequality and high values with high inequality. The minimum value for all measures is zero which is obtained when all units have the same income. The maximum value for the Gini coefficient is one (except with negatives) and the other two measures have no upper limits.

Since no one inequality measure has any greater justification than another, three measures have been chosen that emphasize different aspects of the distribution especially when there is a change in the distribution induced by income transfers between different classes. The Gini is most influenced by changes around the mode (the middle) of the distribution and the T - B and C.V. by changes at the lower and upper ends respectively. Thus, a comparison of changes in the three measures provides some insight to which changes are having the largest effect. For example, little change in the T - B measure but large change in the C.V. would indicate changes to quantile shares in the upper tail of the distribution but not in the lower tail.

1.3. Sources and Methods

The tabulations for the analysis in this report were derived from special files of census data made available to the Consumer Income and Expenditure Division. For the 1961 Census, special files that had earlier been prepared for income analysis of families and individuals were used as the basis of the analysis. For 1971, special files of individuals from the one-third sample, giving family

identifiers, socio-demographic characteristics and income were made available. From these files, family files based on the three family definitions were created from which the tabulations were produced for the analysis.

Excluded from the 1971 data files were individuals living in households in the Yukon and Northwest Territories, i.e., the data are for the 10 provinces.

The distributional data (decile shares, cut-offs, and inequality measures) were calculated by interpolation of income distributions using 94 income classes. For each income class, the estimated number of recipient units and the aggregate income were known. Estimates of income shares and decile cut-offs were derived by simple linear interpolation and the inequality measures were derived by assuming the population within an income class was at the mean.

In Chapter 2 data are presented for a variety of family unit concepts. The reason is to show the importance of specifying the income recipient unit when comparing income distributions and income inequality.

In Chapter 3 the analysis is restricted to the Economic Family Unit concept because this concept is close to the appropriate decision-making unit for cross-sectional analysis.

In Chapter 4 the unit of analysis is the Restricted Census Family Unit where change in the income distribution between the 1961 and 1971 Censuses is examined. Appendix A evaluates census data in light of problems that became apparent from comparisons with other sources.

The decile tabulations in Appendices B and C are presented for all economic family units (families and unattached combined) in the 10 Canadian provinces.

1.3.1. Definitions

The analysis in the following parts relates income inequality to nine selected variables. The variables are defined here and rationalized in the text in the analysis of Chapter 3.

Province:

Newfoundland
Prince Edward Island
Nova Scotia
New Brunswick
Quebec
Ontario
Manitoba
Saskatchewan
Alberta
British Columbia

Rural/urban size groups:

Rural non-farm

Rural farm

Urban:

500,000 and over

100,000 - 499,999

30,000 - 99,999

10,000 - 29,999

5,000 - 9,999

2,500 - 4,999

1,000 - 2,499

Sex of head:

Male

Female

Family unit size:

1 person (unattached individual)⁶

2 persons

3 "

4 "

5 "

6 "

7 "

8 "

9 "

10 persons or more

Age of head:

15 - 24 years

25 - 34 "

35 - 44 "

45 - 54 "

55 - 64 "

65 - 69 "

70 years and over

Number of employment income recipients in family unit:

Number of persons in family unit in receipt of employment income (wages and salaries or self-employment income).⁷

None

One

Two

Three or more

See footnote(s) on page 32.

Work experience of head of family unit:

Full-time worker (the head worked at least 49 weeks on a full-time basis);
part-time worker (the head worked but not full time. The work could have been
less than 49 weeks on a full- or part-time basis or more than 49 weeks mainly
on a part-time basis);
did not work.

Education of head:⁸

No schooling or kindergarten (usually the kindergarten category is excluded;
however, the group is so small that its exclusion or inclusion has no effect).

Elementary:

1 - 4
5 or more

High school:

1
2
3
4
5

University:

1 and 2
3
4 or more
Degree

Major source of income:

That source of income which is numerically the largest (i.e., ignoring the sign in
the case of negative incomes as in self-employment).

Wages and salaries
Non-farm self-employment
Farm self-employment
Government transfer payments
Investment income
Other income
No income

See footnote(s) on page 32.

FOOTNOTES

¹ Assuming equal sized income classes, the heights of the frequencies are proportional to the number in the income class. Generally, it is better to think of the area under the graph as representing the proportion in the income class since income class intervals vary in width (especially at the upper and lower ends of the distribution).

² In the presence of negative incomes, the Gini coefficient may be greater than one.

³ For a more detailed definition of these income sources, the reader is referred to *Incomes of Individuals, Introduction to Vol. III (Part 6)*, Catalogue 94-759, 1971 Census of Canada.

⁴ Families, *Introduction to Vol. II (Part 2)*, 1971 Census of Canada, Catalogue 93-713.

⁵ The reader is referred to *Income Inequality: Statistical Methodology and Canadian Illustrations*, Catalogue 13-559, for a discussion of these conditions.

⁶ In this text persons not in families constitute a family unit of size one and are sometimes called "unattached individuals".

⁷ This terminology is consistent with census usage. However, I will use the terms "number of earners" and "earnings" in a sense equivalent to "number of employment income recipients" and "employment income".

⁸ This study uses slightly different terminology for the schooling characteristics than those given in the census. The equivalents are listed below:

Elementary:

1 - 4 = Grades 1 - 4
5 or more = " 5 - 8

High school:

1	= Grade	9
2	= "	10
3	= "	11
4	= "	12
5	= "	13

CHAPTER 2

INCOME DISTRIBUTION, 1970

This chapter presents summary income distributions for Canada (exclusive of the Yukon and Northwest Territories) within the framework developed in Chapter 1 along with decile shares, Lorenz curves and inequality measures for different recipient unit concepts. It is intended that actual data from the 1971 Census of Canada will give the reader a better appreciation of the conceptual issues. In addition, the aggregate 1971 income distribution data provides a background for the more detailed analysis of Chapter 3 in which the sources of income differences are examined.

2.1. Recipient Units and Income Distribution

Table 2.1 presents decile distributions for Canada on the recipient unit concepts defined in Chapter 1. The first six columns represent income distributions on different family concepts — from the broadly defined economic family to the more restrictive census family concept. It is apparent from Table 2.1 that the family concept can have a bearing on the shape of the distribution — especially at the lower end. The decile cut-offs¹ for the lower deciles are two to three times greater for the economic family than for the restricted census family. Similarly, the income shares are higher for the economic family in the lower deciles.

Compared to other family concepts, the upper decile cut-offs are higher for the economic family but not proportionately as much as for the lower decile. For deciles, up to the sixth, there is a consistent pattern of increasing shares as one switches from the restricted to census to economic family definition. Similarly, in the upper four deciles there is a pattern of declining decile shares as the family unit definition is broadened.

This relationship is shown in Chart 2.1 which shows the Lorenz curve for the three family unit concepts. These data confirm the patterns observed in the decile distributions and the inequality measures presented in Table 2.2. Although the main point of this demonstration is to indicate the quite different distributions resulting from the definition of the family concept, it is also important to investigate the reasons for these differences. As one changes from the EF to CF to the RCF there is a tendency to create a larger number of unattached individuals with low income with the resulting differences reflected in the overall decile summary. An examination of Appendix B, Tables B.1, B.2 and B.3, shows that the decile shares for individual family sizes do not change very much as one changes family definition. Thus, differences in the aggregate results reflect to a large degree the changing structure of the population by family size.

See footnote(s) on page 46.

TABLE 2.1. Decile Distributions and Cut-offs, for Different Recipient Unit Concepts, Canada, 1971

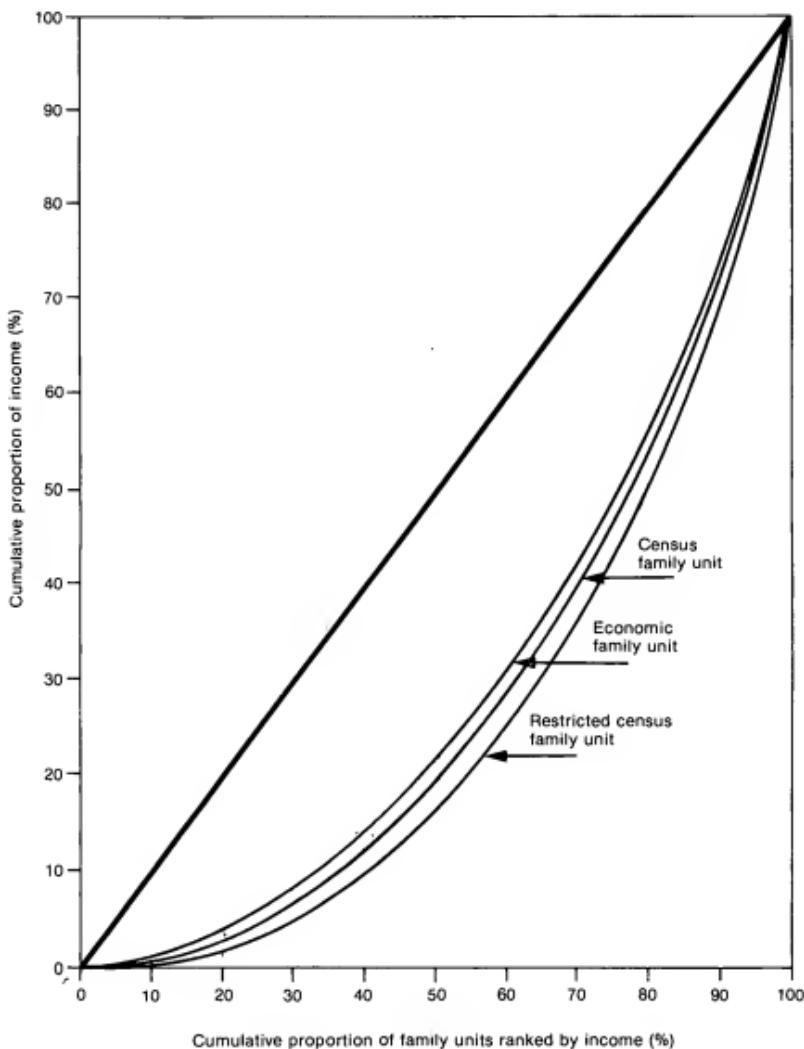
Decile class (1970 income)	Recipient unit concept					
	Economic family unit		Census family unit			
	Decile cut-off	Income share	Decile cut-off	Income share		
	dollars	per cent	dollars	per cent		
Lowest	1,413	0.6	1,257	0.4		
2nd	2,793	2.4	2,181	2.1		
3rd	4,290	4.2	3,587	3.8		
4th	5,815	6.1	5,079	5.7		
5th	7,218	7.8	6,556	7.6		
6th	8,641	9.5	7,992	9.5		
7th	10,229	11.3	9,557	11.4		
8th	12,293	13.5	11,580	13.7		
9th	15,762	16.6	14,874	17.0		
Highest	1	28.0	1	28.9		
	Restricted census family unit		Individuals aged 15 and over			
	Decile cut-off	Income share	Decile cut-off	Income share		
	dollars	per cent	dollars	per cent		
Lowest	472	- 0.1	-	- 0.3	592	0.3
2nd	1,380	1.6	-	-	1,240	1.8
3rd	2,344	2.8	452	0.3	1,771	2.9
4th	3,608	4.7	1,295	2.3	2,795	4.5
5th	5,033	6.8	2,183	4.3	3,930	6.6
6th	6,532	9.1	3,626	7.5	5,100	8.9
7th	8,097	11.6	5,157	11.4	6,421	11.3
8th	10,040	14.3	6,988	15.7	7,961	14.2
9th	13,003	18.0	9,347	20.9	10,237	17.8
Highest	1	31.1	1	37.9	1	31.8

¹ Open-ended class.² In this table and other tables where the term "income recipients" is used it refers to persons aged 15 or over and in receipt of income in 1970.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

Chart — 2.1

Lorenz Curves for Different Family Unit Concepts, Canada, 1971



Source: Derived from Table 2.1.

TABLE 2.2. Inequality Measures for Selected Recipient Unit Concepts, Canada, 1971

Inequality measures of 1970 income	Economic family units	Census family units	Restricted census family units	Individuals aged 15 and over	Income recipients
Gini coefficient	0.418	0.439	0.486	0.609	0.486
T - B coefficient	0.336	0.366	0.434	0.530	0.530
Coefficient of variation. . .	0.881	0.929	1.039	1.361	1.083

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

Table 2.1 also presents income distributions for individuals on two different bases — one, those in receipt of income and the second all individuals 15 years of age and over regardless of their income status. These distributions are not all that significant for welfare comparisons since they exclude some individuals (all non-recipients or those under 15 depending on the universe). However, they are distributions to which reference is made on occasion. The first concept provides an interesting comparison with the restricted census family distribution because of the occurrence of crossing Lorenz curves between the income recipient and restricted census family distributions. This result is due to the inclusion of a large number of individuals with zero income as restricted census family units but their exclusion is on the individual income recipient basis. Very little significance should be attributed to this comparison other than the statistical properties it demonstrates.

In summary, it is clear that the definition of the recipient unit can have a significant impact on the income distribution and income inequality. In other words, it is not possible to talk about the distribution and inequality in isolation from the underlying statistical concepts.

2.2. Income Distributions by Family Unit Size

One of the most accepted justifications for differences in income is variation by family size. If income distributions by family size have very little variation, then one can assume that the measured level of inequality would be of less concern except for the appropriateness of mean income differences by family size. The income distributions in Table 2.1 do not differentiate by family size and consequently they may overemphasize the importance of inequality in the income distribution. Table 2.3 presents summary income distributions for economic family units by size to examine the extent of income variability within individual family size groups.

TABLE 2.3. Decile Distributions of Economic Family Units by Size, Canada, 1971

Decile class (1970 income)	All economic family units	Economic family unit size				
		1 person	2 persons	3 persons	4 persons	5 persons or more
income share in per cent						
Lowest	0.6	-0.1	1.4	1.6	1.9	1.8
2nd	2.4	2.2	3.4	4.2	4.7	4.4
3rd	4.2	3.4	4.6	5.8	6.2	5.9
4th	6.1	4.1	6.3	7.2	7.3	7.0
5th	7.8	5.8	7.9	8.4	8.4	8.1
6th	9.5	8.4	9.5	9.6	9.5	9.3
7th	11.3	11.2	11.2	11.0	10.7	10.6
8th	13.5	14.4	13.3	12.7	12.3	12.4
9th	16.6	18.6	16.0	15.2	14.8	15.1
Highest	28.0	32.2	26.4	24.4	24.4	25.5
Mean income \$	8,332	3,852	8,234	9,629	10,668	11,267
Gini coefficient	0.418	0.495	0.382	0.337	0.322	0.340
T-B coefficient	0.336	0.389	0.275	0.228	0.200	0.213
Coefficient of variation	0.881	1.098	0.830	0.717	0.706	0.737

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

Except for family unit size one, there is a tendency for inequality to be less for individual family sizes compared to all economic family units. Whereas the Gini is 0.418 for all EF units it is 0.495 for unattached individuals and 0.382, 0.337, 0.322 and 0.340 for families of size two through five or more respectively. However, all in all, income differences are still fairly substantial within economic family unit size groups. This suggests that family income differences are still an important concern.

One problem with examining inequality within each family size group is that the logical connection between the individual family size summaries and the overall summary is unclear. One method of dealing with this problem is to scale the income for each family according to its needs (i.e., family size, composition, etc.). Several methods have been suggested to achieve this end:

- (a) ranking by welfare ratio, is determined by dividing family income by the "poverty" line for that family;
- (b) ranking by income per capita.

The welfare ratio is a "well-offness" index that has been proposed to compare families of different size, i.e., two families with a welfare ratio of 1.5 are at equivalent levels of living regardless of family size. Income per capita is a special case of the welfare ratio in that each individual in the family has equal weight. The rankings of all individuals in 1971 using the two criteria are presented in Table 2.4.

Applying these methods, some equalizing of money incomes becomes evident compared to the economic family distributions (see Tables 2.1 and 2.2 for comparisons) although on a per capita basis the share of income accruing to the top decile is greater (29.6 versus 28.0). On a welfare ratio basis, there is a consistent equalizing of the income distribution. However, it is obvious from Tables 2.3 and 2.4 that substantial income variation remains even after "netting out" or isolating the effect of family size.

TABLE 2.4. Decile Distributions and Cut-offs of Individuals According to Per Capita Income and Welfare Ratio, Canada, 1971

Decile class (1970 income)	Per capita		Welfare ratio	
	Decile cut-off	Income share	Decile cut-off	Income share
	dollars	per cent		per cent
Lowest	703	1.2	0.499	1.0
2nd	1,112	3.4	0.793	3.3
3rd	1,435	4.8	1.112	4.9
4th	1,761	5.9	1.399	6.5
5th	2,111	7.2	1.675	7.9
6th	2,526	8.6	1.971	9.4
7th	3,051	10.3	2.324	11.0
8th	3,820	12.6	2.789	13.1
9th	5,236	16.4	3.573	16.1
Highest	1	29.6	1	26.9
Gini coefficient	0.410		0.388	
T-B coefficient	0.300		0.267	
Coefficient of variation	0.866		0.814	

¹ Open-ended class.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

2.3. Income Distribution and Other Characteristics

As well as having different family size compositions the various income classes have different distributions by other characteristics that one expects to be income related. A number of these are shown in Table 2.5 and one sees that there are substantial variations in the distribution of the deciles by various characteristics. For example:

- Family units headed by females are more predominant in the low deciles — 52.7% of family units in the lowest decile are headed by females compared with 4.3% in the top decile.

TABLE 2.5. Percentage Distribution of Economic Family Units Within Deciles
by Selected Characteristics, Canada, 1971

Selected characteristics	Total	Decile class (1970 income)			
		Lowest	2nd	3rd	4th
Canada	100.0	100.0	100.0	100.0	100.0
Provinces:					
Newfoundland	1.8	1.9	2.6	2.7	2.5
Prince Edward Island	0.5	0.5	0.7	0.8	0.6
Nova Scotia	3.5	3.7	4.2	4.6	4.4
New Brunswick	2.6	2.8	3.2	3.5	3.3
Quebec	26.8	28.2	26.0	26.9	29.8
Ontario	36.9	30.3	30.8	30.9	32.2
Manitoba	4.8	5.8	5.9	5.6	5.0
Saskatchewan	4.4	6.6	6.9	6.0	4.9
Alberta	7.7	8.7	8.4	8.3	7.4
British Columbia	11.1	11.0	11.7	10.7	9.9
Rural/urban size:					
Rural non-farm	15.5	18.1	21.7	20.6	18.8
Rural farm	5.1	7.8	7.2	8.1	6.6
50,000 and over	34.9	31.7	29.0	29.7	32.3
100,000-499,999	16.4	14.9	14.1	14.4	14.7
30,000- 99,999	9.0	8.7	8.2	8.1	8.4
10,000- 29,999	7.9	7.7	7.2	7.1	7.3
5,000- 9,999	3.8	3.6	3.7	3.7	3.7
2,500- 4,999	3.8	3.6	4.4	4.2	4.1
1,000- 2,499	3.6	3.8	4.6	4.2	4.1
Sex of head:					
Male	79.8	47.3	55.9	68.6	75.8
Female	20.2	52.7	44.1	31.5	24.2
Age of head:					
15-24 years	9.9	22.7	12.5	14.8	13.8
25-34 "	20.5	11.5	9.8	15.9	21.3
35-44 "	19.4	9.8	8.2	13.1	17.0
45-54 "	18.2	11.3	9.4	13.0	15.3
55-64 "	15.1	16.5	13.4	14.7	15.3
65-69 "	5.8	7.6	11.7	8.6	6.9
70 years and over	11.2	20.6	35.0	19.9	10.5

**TABLE 2.5. Percentage Distribution of Economic Family Units Within Deciles
by Selected Characteristics, Canada, 1971 — Continued**

Selected characteristics	Decile class (1970 income)					
	5th	6th	7th	8th	9th	Highest
Canada	100.0	100.0	100.0	100.0	100.0	100.0
Province:						
Newfoundland	2.0	1.7	1.6	1.3	1.0	0.9
Prince Edward Island	0.5	0.5	0.4	0.3	0.2	0.2
Nova Scotia	4.1	3.6	3.1	2.8	2.4	2.1
New Brunswick	3.1	2.8	2.4	2.0	1.7	1.3
Quebec	29.5	27.9	26.0	24.6	23.9	24.6
Ontario	34.4	36.5	39.4	42.1	45.1	47.0
Manitoba	4.7	4.7	4.5	4.3	3.9	3.4
Saskatchewan	4.1	3.7	3.5	3.1	2.7	2.2
Alberta	7.2	7.3	7.4	7.6	7.4	7.2
British Columbia	10.5	11.3	11.8	11.8	11.5	11.1
Rural/urban size:						
Rural non-farm	16.9	15.5	13.5	11.7	10.0	8.0
Rural farm	5.0	3.9	3.2	2.9	2.9	3.5
500,000 and over	33.4	33.5	35.1	37.2	40.6	46.7
100,000-499,999	15.7	16.9	17.9	18.6	18.9	18.2
30,000-99,999	9.1	9.7	9.9	10.0	9.5	8.4
10,000-29,999	8.1	8.6	8.8	8.7	8.4	7.2
5,000-9,999	3.9	4.2	4.1	4.1	3.6	3.0
2,500-4,999	4.0	4.0	3.9	3.7	3.4	2.9
1,000-2,499	3.9	3.7	3.5	3.1	2.7	2.2
Sex of head:						
Male	83.8	89.5	92.3	94.1	95.1	95.7
Female	16.1	10.5	7.7	5.9	4.9	4.3
Age of head:						
15-24 years	11.0	8.2	6.7	5.2	3.0	0.9
25-34 "	25.9	27.9	28.0	26.5	23.7	14.3
35-44 "	19.7	23.3	24.9	26.3	26.5	25.1
45-54 "	16.6	17.8	19.4	21.6	25.6	32.2
55-64 "	15.0	14.0	13.6	13.9	14.9	19.4
65-69 "	5.2	4.1	3.5	3.2	3.1	3.9
70 years and over	6.6	4.8	3.9	3.3	3.2	4.2

TABLE 2.5. Percentage Distribution of Economic Family Units Within Deciles
by Selected Characteristics, Canada, 1971 — Continued

Selected characteristics	Total	Decile class (1970 income)			
		Lowest	2nd	3rd	4th
Education of head:					
No schooling or kindergarten	2.6	6.2	4.8	3.1	2.1
Elementary:					
1-4	6.0	10.6	12.2	8.9	6.6
5 or more	31.2	35.1	40.6	38.2	36.2
High school:					
1	9.7	8.9	8.6	9.8	10.5
2	11.5	9.6	9.0	10.6	11.7
3	9.4	7.6	6.4	8.1	9.3
4	12.9	11.0	8.9	11.0	12.3
5	4.4	3.4	3.1	3.1	3.6
University:					
1 and 2	4.1	3.3	2.7	2.9	3.5
3	0.6	0.6	0.5	0.5	0.5
4 or more	0.5	0.4	0.4	0.4	0.4
Degree	7.1	3.2	2.9	3.4	3.3
Work experience of head:					
Full time	51.6	11.0	13.0	29.1	45.6
Part time	28.2	26.1	32.1	39.5	37.8
Did not work	20.2	63.0	55.0	31.5	16.5
Number of earners:					
None	15.9	64.4	50.4	24.2	9.3
One	46.8	32.6	43.8	62.8	68.7
Two	27.8	2.6	5.3	11.6	19.4
Three or more	9.5	0.4	0.6	1.4	2.6
Family unit size:					
1 person	26.1	76.0	56.5	37.5	30.5
2 persons	21.8	9.9	24.1	28.2	24.6
3 "	14.8	5.1	7.7	11.8	14.6
4 "	15.3	3.8	5.0	9.0	12.0
5 "	10.2	2.4	3.0	5.8	7.6
6 "	5.8	1.4	1.7	3.4	4.7
7 "	3.1	0.8	1.0	2.1	2.9
8 "	1.3	0.3	0.5	1.0	1.4
9 "	0.7	0.2	0.3	0.6	0.8
10 persons or more	0.8	0.2	0.3	0.7	1.0
Major source of income:					
Wages and salaries	72.8	23.3	32.6	56.4	75.9
Non-farm self-employment	4.2	2.9	2.9	4.8	4.8
Farm self-employment	2.5	4.8	3.9	4.6	3.4
Investment income	3.0	3.0	5.2	5.6	4.2
Government transfer payments	13.0	42.4	51.7	23.6	7.6
Other income	2.3	1.5	3.8	5.1	4.1
No income	2.2	22.2	-	-	-

**TABLE 2.5. Percentage Distribution of Economic Family Units Within Deciles
by Selected Characteristics, Canada, 1971 — Concluded**

Selected characteristics	Decile class (1970 income)					
	5th	6th	7th	8th	9th	Highest
Education of head:						
No schooling or kindergarten	1.9	1.6	1.5	1.5	1.7	1.9
Elementary:						
1-4	5.3	4.3	3.6	3.1	2.9	2.6
5 or more	34.3	32.0	28.5	25.5	22.8	19.1
High school:						
1	11.1	11.3	10.8	9.9	8.8	6.8
2	12.4	13.1	13.5	13.3	12.3	9.4
3	9.9	10.7	11.1	11.4	10.9	8.8
4	12.8	13.7	15.2	15.9	15.6	12.8
5	3.9	3.9	4.6	5.4	6.3	6.6
University:						
1 and 2	3.9	4.1	4.5	5.2	5.6	5.8
3	0.5	0.6	0.6	0.7	0.8	0.9
4 or more	0.4	0.5	0.5	0.5	0.5	0.5
Degree	3.7	4.4	5.7	7.5	12.0	24.7
Work experience of head:						
Full time	57.4	64.9	69.6	73.4	76.1	76.1
Part time	32.9	28.1	24.8	21.9	19.7	19.1
Did not work	9.8	7.0	5.6	4.7	4.3	4.8
Number of earners:						
None	4.0	2.2	1.5	1.1	0.9	1.3
One	66.4	58.3	47.6	35.9	26.2	26.1
Two	25.7	33.7	42.2	49.3	50.4	38.0
Three or more	3.9	5.9	8.8	13.8	22.6	34.6
Family unit size:						
1 person	23.0	14.5	9.9	6.0	4.0	3.5
2 persons	23.5	22.6	22.7	22.9	22.1	17.7
3 "	17.0	18.2	18.8	19.1	19.2	17.0
4 "	15.9	19.4	21.4	22.0	22.2	22.3
5 "	9.5	12.3	13.3	14.7	15.7	17.9
6 "	5.2	6.7	7.1	8.1	8.7	10.8
7 "	3.0	3.5	3.7	4.0	4.5	5.9
8 "	1.3	1.5	1.5	1.6	1.8	2.3
9 "	0.7	0.7	0.8	0.8	0.9	1.2
10 persons or more	0.9	0.8	0.8	0.9	1.0	1.4
Major source of income:						
Wages and salaries	86.0	90.4	92.3	93.1	93.0	84.8
Non-farm self-employment	4.2	3.7	3.3	3.3	3.6	8.7
Farm self-employment	2.2	1.5	1.2	1.0	1.0	1.4
Investment income	2.7	2.0	1.5	1.4	1.5	3.4
Government transfer payments	2.4	1.0	0.5	0.2	0.2	0.1
Other income	2.5	1.5	1.1	0.9	0.9	1.6
No income	-	-	-	-	-	-

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

2. The lower deciles contain a more than proportionate share of family units with young and elderly heads — 22.7% and 20.6% of family units in the bottom decile have heads in the youngest and oldest age groups. The comparable statistics for the top decile are 0.9% and 4.2% respectively.
3. Being in upper deciles is associated with family heads having higher levels of education. About 3% of family heads in the bottom decile have a university degree while 24.7% are in the same category in the top decile.
4. In the bottom decile, 63.0% of family heads did not work in 1970, while 76.1% of family heads in the top decile worked full time.
5. Associated with 4, the deciles have very different distributions by number of earners. Family units in the higher deciles have a much higher proportion of multiple earners — 34.6% of family units in the top decile had three or more earners compared to 5.9% in the sixth decile and 0.4% in the lowest decile.
6. The distribution of the deciles by family unit size varies significantly — the bottom decile is 76.0% unattached individuals, while deciles seven through 10 contain at most 10% unattached individuals. This is why we must be careful about making inequality judgements from the overall distribution.

Chapter 3 examines the extent to which these variations are systematically related to income inequality.

2.4. Comparison with Income Distributions Produced by the Survey of Consumer Finances

The Survey of Consumer Finances (SCF) at Statistics Canada has been producing income distributions from survey data on a regular basis since 1951.² The income concept in this survey is identical to that measured in the census. The coverage, however, is somewhat different — the census includes institutions and Indian reserves, military camps and overseas households while the surveys do not. (The Yukon and Northwest Territories, which are excluded from the census data used in this analysis are also excluded in the surveys.) Since there was no survey for the year 1970, Table 2.6 presents income distributions for 1969 and 1971 survey years and for the census on a comparable basis.

The survey and census data appear reasonably compatible although it appears that census data may show a somewhat higher proportion of units at the higher income levels and also a higher degree of inequality, although this is marginal based on the Gini coefficient. One reason for this difference relates to the fact that the census has a much higher sampling ratio than the surveys (1/3 versus 1/200) and consequently is in a better position to represent the high income population which is relatively rare throughout the population but is very important for calculating income shares because of its high income. Secondly, the

See footnote(s) on page 46.

census generally has a much higher response rate than that associated with the surveys (greater than 90% versus 75% - 80%). However, the census does have disadvantages that may offset these advantages — for example, the survey data have the advantage of established processing procedures and are subject to more thorough checking than is possible for census data because of their volume. (However, a special check was made of all census records showing an income of \$50,000 or more.)

TABLE 2.6. Decile Distributions of Income Recipients from Surveys of Consumer Finances and 1971 Census of Canada

Decile class	Survey of Consumer Finances		1971 Census (1970 income)	
	1969 income	1971 income	10 provinces	Universe comparable to surveys
income share in per cent				
Lowest	0.4	0.3	0.3	0.7
2nd	1.8	1.7	1.8	1.9
3rd	2.9	2.9	2.9	2.8
4th	4.6	4.3	4.5	4.5
5th	6.8	6.6	6.6	6.6
6th	9.1	9.0	8.9	8.9
7th	11.5	11.6	11.2	11.3
8th	14.3	14.5	14.2	14.1
9th	17.9	18.1	17.8	17.8
Highest	30.8	31.1	31.8	31.7
Gini coefficient	0.477	0.484	0.486	0.485

Source: Statistics Canada, Surveys of Consumer Finances, 1970 and 1972; and 1971 Census of Canada, unpublished data.

2.5. The Effect of Direct Taxes

The money income distribution, since it does not subtract taxes, is not most relevant for comparison of income distributions. An examination of the effect of taxes is usually discussed in the context of net fiscal incidence which requires complex assignments of a multitude of taxes, direct and indirect. Most indirect taxes are regressive so their exclusion tends to underestimate inequality. The major direct tax is the personal income tax which is generally progressive. The census does not ask a question on income taxes but the Survey of Consumer Finances does (since 1971) and Table 2.7 gives the distribution of income after tax from this source.

Comparing this with the survey results before taxes in Table 2.6 two observations are worth making: first, there has not been a substantial reduction in overall inequality and second, that the greatest reduction occurs in the top decile.

Thus, any distortions from not using income after tax data will be moderate, although it may be important for intertemporal comparison when there are substantial modifications to a tax structure.

TABLE 2.7. Distribution of Income After Tax, Economic Family Units, 1971

Decile class	Share of income after tax
Lowest	1.1
2nd	3.1
3rd	4.9
4th	6.6
5th	8.3
6th	9.9
7th	11.5
8th	13.5
9th	16.1
Highest	25.0
Measures:	
Gini coefficient	0.373
Coefficient of variation.	0.829

Source: Statistics Canada, Survey of Consumer Finances, 1972, unpublished data.

FOOTNOTES

¹ The decile cut-offs are the dollar values that divide the income ordered population into 10 equal sized groups.

² See *Income Distributions by Size in Canada*, Catalogue 13-207 (Annual). The surveys exclude most institutional households but include such collectives as Hutterite colonies, lodging houses, etc.

CHAPTER 3

INCOME DIFFERENCES WITHIN AND BETWEEN GROUPS, 1970

3.1. Introduction

In Chapter 2, it has been shown that substantial family money income differences exist even after allowing for possibly acceptable income differences by family size. Further classifications of the population indicate that the composition of income deciles varies substantially with a number of other characteristics (such as region, rural/urban size, number of family earners, etc.) that are purported to cause income differences. The purpose of this section is to examine in greater detail the extent to which these other variables are related to the inequality in the family income distribution. For example, one expects family income to vary systematically by variables such as education and weeks worked by the head of the family. These differences are sources of income inequality which may explain why there is still a substantial degree of it within each family size category.

It is important to note in searching for variables related to income differences that one is not saying whether such differences are acceptable as in the case of family size. This is a much broader issue involving social judgement of a non-economic nature. One is only trying to sort out the applicability and importance of variables that may affect income so as to be in a better position to understand some of the forces that shape the distribution of income.

Specifically, this part attempts to provide answers to the following questions:

- (a) To what extent can overall money income be associated with income difference by selected characteristics?
- (b) Which between-group differences are important in explaining income differences, i.e., which types of classifications of the population result in the greatest amount of income inequality?

Once income differences are associated with between-class differences, more knowledge has been attained. It is then possible to have a better understanding of the reasons for income inequality and to be in a position to judge the relevance of the differences associated with selected variables.

The purposes of this section are reasonably modest and the nature of the science dictates that this must be so. The analysis is not based on a complete economic model mainly because such a generally accepted model does not exist. The impetus for the discussion quite frankly draws on intuitive knowledge of how the process is conceived to operate. At present, the most developed theory explaining income variations relates only to homogeneous population groups of

individuals (for example, males in prime age groups). This theory ignores much income variability and further theoretical work is required to explain income variations among families.

However, the fact remains that the distribution of total family income among the population is of great interest because of its interpretation as an indicator of the distribution of economic well-offness. This naturally leads to a desire to understand the process of family income determination especially in relation to socio-demographic and economic characteristics of the family. Many variables have been suggested and this analysis presents one method for attempting to attribute the importance of selected variables to the problem of income inequality.

3.2. Methodology¹

In order to examine the extent to which a relationship between income and a selected variable accounts for inequality, one wants to estimate the "effect" of the variable in question and then subtract or net it out of the overall relationship. For example, to estimate the effect of eliminating differences in mean income by age of head, an estimate of the degree of inequality in the absence of these differences is required.

There are a number of ways of estimating this effect. This report uses two methods.² The first method, called standardization, is to work directly at eliminating between-class differences in average incomes by operating on the constituent distributions (for example, income distributions by age), hypothetically making the mean incomes of the various sub-groups equal (by adjusting each constituent distribution by the factor $\frac{\mu}{\mu_i}$ where μ is the overall mean and μ_i is the mean of the i th constituent distribution), re-combining the distributions for display and then calculating whatever inequality measure desired. This approach has the advantage of actually observing the resulting distribution, which does not occur in some of the other approaches.

The second approach is to calculate the inequality measure under the hypothetical condition by subtracting the between-class component from the overall inequality measure. The between-class component is attributable to the variable under examination. This component is calculated by using only the relative sizes and mean incomes of the constituent groups and it is not necessary to utilize the within-class information in this analysis. This approach is valid when the inequality measure is decomposable into independent between- and within-class components. Additionally, it is desirable for interpretation that the within-class component be equivalent to the inequality measure using the standardization approach. These conditions are satisfied with the T-B coefficient but not the Gini or C.V.

See footnote(s) on page 74.

The second approach is particularly advantageous if one wants to examine the inequality structure by a large number of characteristics simultaneously since income class is not required as a variable in the table.³ Since a large number of variables generate very large tables, this method has been used in the detailed analysis by family size.

3.2.1. Decomposition of T - B Coefficient

The decomposition formula for the T - B coefficient is:

$$T - B = \sum_g p_g T - B_g + \sum_g p_g \log \frac{p_g}{y_g} \quad (1)$$

where

p_g = proportion of population in category g of a given classification;

$T - B_g$ = T - B coefficient for the gth category;

y_g = proportion of income in category g.

The first term on the right-hand side is a weighted average of the T - B coefficient **within** each of the g groups and the second term is a linear combination of the group means the weights being the relative population shares.

One can verify that the standardization process gives a result equivalent to the first term of the right-hand side of I. Consequently, an alternative method of deriving the first term is to calculate

$$T - B - \sum_g p_g \log \frac{p_g}{y_g}$$

which offers significant computational advantage in large classifications.

When comparing the inequality due to various classifications, one is really comparing the between-class terms. Extensions of this process, which are quite straightforward, are explained in the multivariate standardization.

3.3. The Variables

It is useful to think in the context of a dependent and independent variable. The dependent variable is the one whose behaviour or movement one is interested in explaining. In this analysis, the dependent variable is family money income.

See footnote(s) on page 74.

The independent variables are those whose effect on the dependent variable is to be examined. For the purpose of this analysis, the variables can be conveniently grouped into three sets:

- geographic variables;
- demographic variables;
- economic variables.

The precise definitions of the selected variables are stated in Chapter 1. At this point, a brief rationalization of their inclusion is presented.

Geographic variables — Rural/urban income differences and differences between provinces are of concern to policy makers at federal, provincial and municipal levels, and therefore these are examined here for their relevance to money income inequality.

Demographic variables — This group includes family size, age and sex of head. Some difference in income by family size is considered justified. In the analysis, it will be shown how much inequality can be attributed to family size differences in mean income. Income differences by age and sex are well known but their quantitative impact on overall inequality absolutely and relatively to other variables is less well documented.

Economic variables — There are variables that relate directly to the generation of income, i.e., work experience of head, education of head and number of earners in the family. These variables are more directly related to the generation of earned income (which is the largest component of total income); variables relating to unearned income such as investment income and transfer payments are generally excluded although the classifications by age and major source of income shed some light on the impact of these other incomes.

Traditional analysis has considered income source as affecting the degree of inequality mainly through changes in the relative shares of earned⁴ and non-earned income (in the most part taken to be property income). Since earned income is usually more equally distributed, a trend toward greater relative share of earned income should result in a decline in income inequality. Additionally, the expanding role of the government and its expenditure on social welfare programs has resulted in a desire to understand and estimate the effect of these expenditures on the distribution of income and income inequality.

3.4. Summary Data

Table 3.1 presents summary data for Canadian economic family units for the selected variables.

See footnote(s) on page 74.

TABLE 3.1. Inequality Summary by Selected Characteristics of Economic Family Units, Canada, 1971

Selected characteristics	1970 mean income	Distribution of family units	Measure of inequality		
			Gini coefficient	T-B coefficient	Coefficient of variation
	dollars	per cent			
Canada	8,332	100.0	0.4177	0.3359	0.8813
Province:					
Newfoundland	6,569	1.8	0.4167	0.3272	0.9007
Prince Edward Island	6,230	0.5	0.4244	0.3228	0.8973
Nova Scotia	7,042	3.5	0.4110	0.3245	0.8840
New Brunswick	6,777	2.6	0.4056	0.3134	0.8341
Quebec	8,055	26.8	0.4178	0.3291	0.8873
Ontario	9,292	36.9	0.4002	0.3159	0.8450
Manitoba	7,350	4.8	0.4322	0.3527	0.8936
Saskatchewan	6,252	4.4	0.4632	0.3732	0.9553
Alberta	8,040	7.7	0.4346	0.3610	0.9213
British Columbia	8,401	11.1	0.4137	0.3393	0.8675
Rural/urban size:					
Rural non-farm	6,667	15.5	0.4211	0.3278	0.8805
Rural farm	6,361	5.1	0.5071	0.3907	1.1028
500,000 and over	9,315	34.9	0.4147	0.3379	0.8893
100,000-499,999	8,869	16.4	0.3991	0.3210	0.8354
30,000-99,999	8,409	9.0	0.3957	0.3137	0.8194
10,000-29,999	8,315	7.9	0.3922	0.3042	0.7864
5,000-9,999	8,013	3.8	0.3921	0.3002	0.7862
2,500-4,999	7,705	3.8	0.4041	0.3146	0.8423
1,000-2,499	7,310	3.6	0.4101	0.3175	0.8393
Sex of head:					
Male	9,382	79.8	0.3763	0.3685	0.8050
Female	4,184	20.2	0.4921	0.4141	1.0689
Age of head:					
15-24 years	4,799	9.9	0.4440	0.3674	0.8251
25-34 "	8,622	20.5	0.3195	0.2062	0.6297
35-44 "	10,013	19.4	0.3485	0.2325	0.7428
45-54 "	10,601	18.2	0.3820	0.2789	0.8029
55-64 "	8,837	15.1	0.4414	0.3694	0.9602
65-69 "	6,420	5.8	0.4810	0.4109	1.1617
70 years and over	4,626	11.2	0.4872	0.3917	1.2694

TABLE 3.1. Inequality Summary by Selected Characteristics of Economic Family Units, Canada, 1971 - Concluded

Selected characteristics	1970 mean income	Distri- bution of family units	Measure of inequality		
			Gini coefficient	T-B coefficient	Coefficient of variation
	dollars	per cent			
Education of head:					
No schooling	6,019	2.6	0.5372	0.4675	1.1627
Elementary:					
1-4	5,526	6.0	0.4718	0.3897	0.9939
5 or more	6,996	31.2	0.4161	0.3256	0.8475
High school:					
1	7,816	9.7	0.3831	0.2864	0.7748
2	8,302	11.5	0.3727	0.2770	0.7532
3	8,714	9.4	0.3715	0.2773	0.7749
4	8,803	12.9	0.3755	0.2880	0.7676
5	9,969	4.4	0.3904	0.3073	0.8251
University:					
1 and 2	9,785	4.1	0.3870	0.3011	0.8132
3	9,625	0.6	0.4203	0.3544	0.8892
4 or more	8,892	0.5	0.4196	0.3459	0.8890
Degree	14,859	7.1	0.3929	0.2960	0.8340
Work experience of head:					
Full time	10,727	51.6	0.3184	0.1809	0.6980
Part time	7,301	28.2	0.4156	0.3416	0.9177
Did not work	3,655	20.2	0.5385	0.4399	1.3126
Number of earners:					
No one	2,410	15.9	0.5120	0.3529	1.4310
One	7,339	46.8	0.3818	0.2870	0.8735
Two	11,086	27.8	0.2775	0.1395	0.6190
Three or more	15,114	9.5	0.2665	0.2147	0.5764
Major source of income:					
Wages and salaries	9,644	72.8	0.3260	0.2180	0.6736
Non-farm self-employment	11,525	4.2	0.5161	0.4204	1.1637
Farm self-employment	5,334	2.5	0.5993	0.3976	1.3844
Government transfer payments	2,271	13.0	0.3463	0.2352	0.7123
Investment income	8,122	3.0	0.5361	0.5563	1.4576
Other income	6,727	2.3	0.4533	0.3633	1.1770
No income	-	2.2	-	-	-
Family unit size:					
1 person	3,852	26.1	0.4946	0.3889	1.0976
2 persons	8,234	21.8	0.3817	0.2751	0.8301
3 "	9,627	14.8	0.3368	0.2277	0.7172
4 "	10,668	15.3	0.3216	0.2000	0.7056
5 "	11,288	10.2	0.3306	0.2036	0.7181
6 "	11,461	5.8	0.3420	0.2134	0.7471
7 "	11,249	3.1	0.3497	0.2235	0.7450
8 "	10,968	1.3	0.3571	0.2268	0.7807
9 "	10,738	0.7	0.3623	0.2340	0.7671
10 persons or more	10,601	0.8	0.3638	0.2353	0.7763

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

Family unit income by province ranges from about \$6,000 in Saskatchewan and Prince Edward Island to \$9,000 in Ontario. Although there are substantial income differences by province, there are much greater differences on the basis of some of the other characteristics of the economic family unit in the table – for example, by sex of head, age of head and schooling of head.

The relative population weights of the various provinces suggest that some provinces, although low in average income, will affect very marginally the degree of total inequality.

Comparisons of within-group inequality across the provinces suggest very little variation when compared with the variation by some other characteristics. The Gini varies from 0.40 - 0.46, the T - B from 0.31 - 0.37 and the C.V. from 0.83 - 0.95. The ranking of the provinces suggests that internal inequality is least in Ontario and New Brunswick and greatest in the three Prairie provinces. Reasons for these differences or by any other characteristics could form a study in itself. The interest in this report is to assess the impact and importance of the selected variables on the overall aggregate level of inequality.

Average family unit income tends to be lowest in rural areas. Within urban areas there is a consistent pattern towards average income increasing with urban size category. Rural farm areas have the highest degree of income inequality on all measures. Otherwise, there is very little variation in the degree of inequality between urban size categories.

Average family unit income by sex of head varies by a factor of more than two to one, \$9,382 for male headed families and \$4,184 for female headed families. As well, internal inequality is much higher for female headed family units than it is for those with male heads, 0.4921 versus 0.3763, for the Gini coefficient and similar differences for the other two inequality measures.

The pattern of average income by age follows the typical life cycle pattern – increasing average family unit income as the age of head increases to the 45 - 54-year age group and declining thereafter. Young family units have an average income of \$4,799 compared to \$10,601 and \$4,626 for those with heads in the 45 - 54 and 70 years and over age groups respectively. Inequality also increases with age over most of the range.

One interpretation of the education variable is that productivity increases with education, which generates increased income. Except for some minor exceptions, there is some indication of this situation. Family units with heads in the elementary education groups have average incomes in the \$5,000 - \$7,000 range, those in the high school range \$8,000 - \$10,000 and those with a degree \$15,000. The uneven income pattern for family units within the university range is partly due to the fact that many of them are still in school and may only work part of the year.

There are significant differences in average incomes and inequality when family units are categorized according to work experience of the head or the number of earners in the family unit. Family units where the head worked full time and where there were two or more earners have substantially higher incomes than other family units. In 1970, approximately 37% of family units have two or more earners.⁵

It is also important to note the substantially lower inequality among family units with high degrees of labour force activity — 0.3184 and 0.2775 for families with full-time heads and two earners respectively and 0.4156 and 0.3818 for family units with part-time heads and one earner families respectively. An explanation of this may be the substantially different socio-demographic composition of the two groups.

It has been argued that some income sources are more equally distributed than others and thus changes in the relative importance of income sources will have an influence on overall inequality. The census data suggest that families whose major source of income is wages and salaries or government transfer payments have lower degrees of inequality, 0.3260 and 0.3463 respectively than for other types of income — in the 0.5 range for self-employment income and interest and dividends.

The final classification in the table, family size, shows that average incomes increase by family size up to six but tend to decline slightly thereafter. Within family size groups, the greatest degrees of inequality are for family sizes one and two. In the middle family sizes, three to seven, the degree of inequality varies only slightly; for larger family sizes inequality is somewhat higher, although lower than for the small family size categories. The large family sizes are likely a rather heterogeneous group including some units with a large number of young children and others with several working adults.

3.5. Standardized Distributions

The data in Table 3.1 suggest that differences in the average incomes of family units by the selected characteristics can result in income inequality. To assess the impact of these variables, the standardization process described in the methodology section has been applied to each variable individually. The results of this standardization process are presented in Table 3.2.

The most striking observation from Table 3.2 is the very small degree of equalization that occurs in the various standardizations. The geographic standardization results in minimal changes in the distribution — lowest decile shares remain the same and the largest change, about 0.3 percentage points, occurs in the top decile which declines to 27.7% from 28.0%.

See footnote(s) on page 74.

TABLE 3.2. Standardized Distributions of Economic Family Units by Selected Characteristics, Canada, 1971

Selected characteristics	Decile class (1970 income)						
	Lowest	2nd	3rd	4th	5th	6th	
Actual distribution	0.6	2.4	4.2	6.1	7.8	9.5	
Standardized for:							
Province	0.6	2.5	4.3	6.1	7.9	9.5	
Rural/urban size	0.6	2.5	4.4	6.2	7.9	9.6	
Sex of head	0.8	3.0	4.6	6.3	7.9	9.4	
Age of head	0.8	3.0	4.7	6.4	7.8	9.3	
Education of head	0.7	2.7	4.5	6.3	8.0	9.7	
Work experience of head.	0.9	3.6	5.0	6.4	7.6	9.0	
Number of earners	1.0	4.0	5.6	6.8	8.1	9.4	
Major source of income	1.5	4.1	5.6	6.7	7.9	9.3	
Family unit size.	1.0	3.4	4.8	6.4	7.8	9.3	
	Decile class (1970 income)				Measure of inequality		
	7th	8th	9th	Highest	Gini coefficient	T-B coefficient	Coefficient of variation
Actual distribution	11.3	13.5	16.6	28.0	0.4177	0.3359	0.8813
Standardized for:							
Province	11.3	13.4	16.5	27.8	0.4144	0.3300	0.8599
Rural/urban size	11.3	13.4	16.5	27.7	0.4133	0.3280	0.8369
Sex of head	11.0	13.0	16.1	27.9	0.4022	0.2974	0.8445
Age of head	11.0	13.0	16.1	27.8	0.4004	0.2970	0.8516
Education of head	11.4	13.4	16.5	27.0	0.4028	0.3106	0.8177
Work experience of head.	10.5	12.5	15.6	28.9	0.3969	0.2770	0.8869
Number of earners	10.7	12.3	14.8	27.3	0.3673	0.2409	0.8596
Major source of income	10.8	12.6	15.4	26.0	0.3569	0.2484	0.7597
Family unit size.	10.9	13.0	16.1	27.4	0.3911	0.2708	0.8303

Source: Statistics Canada, 1971 Census of Canada, unpublished data and computations by the author.

Standardizations, according to age and sex of the family head, result in slightly more equalization than the geographic standardizations. Income shares at the bottom three deciles increase in absolute percentage terms, about 0.2%, 0.6% and 0.5% respectively and the largest declines occur in the eighth and ninth deciles, 0.5% in each case. Although some of the percentage increases in the bottom deciles are large, the resulting distributions still indicate substantial degrees of inequality after standardization.

The economic variables, except for education where the changes are similar to those of age and sex of head, result in somewhat more significant changes than the geographic variables or age-sex of head. For example, by number of earners, the income shares of the bottom three deciles increase to 1.0%, 4.0% and 5.6% from 0.6%, 2.4% and 4.2% respectively. The standardization by work experience of head has resulted in an "adverse" situation in that the process of standardization results in an increase in the share of income accruing to the top decile, although there are also substantial increases in income shares in the bottom deciles. (Note that the standardized C.V. has increased whereas the Gini and T - B have declined; results of this type suggest non-uniform changes in the income distribution as observed.)

The standardization by major source of income has the greatest equalizing effect on the income distribution. The share of income accruing to the bottom decile more than doubles and share of the top decile decreases by 2 percentage points.

Finally, the last row in Table 3.2 presents a standardization by family size. This standardization needs to be interpreted differently than the others since it is doubtful that anyone would want to promote complete equalization of incomes regardless of family size. However, it is worthwhile to know what inequality is attributable to differences in average income by family size. An estimate of this is obtained by calculating the income distribution under the assumption of equal family income for all size groupings and then attributing the difference between "actual" and "standardized" to family size. Thus, the family size standardized distribution could be interpreted as the distribution that would result if the population did not have any family size differences. Even then, the distribution would be largely unchanged.

The inequality measures in the last three columns of Table 3.2 provide a convenient method of summarizing the effects of the standardizations and ranking them in terms of the inequality reducing impact. As suggested by the preceding analysis, the standardized inequality measures for the geographic variables are very close to the actual measures, are somewhat lower when standardized for age and sex of head, and are least when standardized for major source of income and number of earners in the family unit. The outcome of standardizing by work experience of head is an increase in C.V. and decline in the T - B and Gini since the Lorenz curve for the standardized distribution intersects that of the unstandardized distribution.

If the variables are ranked according to their ability to reduce inequality, the following results occur:

Variable	Ranked by		
	Gini coefficient	T - B coefficient	Coefficient of variation
Major source of income	1	2	1
Number of earners	2	1	6
Work experience of head	3	3	8 ¹
Age of head	4	4	5
Sex of head	5	5	4
Education of head	6	6	2
Rural/urban size	7	7	3
Province	8	8	7

¹ Crossing Lorenz curves.

This table gives very similar rankings for the Gini and the T - B but quite different ones for the C.V. The results for C.V. appear to be quite sensitive to changes in the very high income classes. This may explain why number of earners and work experience rank so low in respect to the C.V. and education of head and rural/urban size rank high. These are good examples of how the analysis can depend on the characteristics of the selected inequality measure.

The next section concentrates on a multivariate analysis and is restricted to the T - B coefficient because of its desirable decomposition properties. Dealing with a larger number of variables simultaneously, one can account for more inequality and for the fact that some of the independent variables are correlated. The use of the direct decomposition methodology results in the loss of the standardized distribution. However, it is unlikely that "large" inequality reductions would be associated with crossing Lorenz curves (it is only in extreme situations that one could have crossing Lorenz curves and large "inequality" reductions; it is possible to construct such examples).

Although an analysis is presented for all family units, it has been decided to concentrate on the separate analyses for the individual family sizes because of the inherent difficulties in dealing with income differences by family size. In this way, it is possible to compare the effect of the same variables across the different family size groups; in this way a better understanding of the income receiving process evolves.

3.5.1. Summary

While the data in Table 3.1 provide a useful description of some family income differences that actually exist by socio-demographic and economic characteristics and the pattern of inequality within the characteristics, one does not obtain an empirical estimate of the effect that each of the variables has on overall inequality. For example, although there are obviously extreme differences in average incomes by sex, one does not know how much these differences affect overall inequality or whether this variable is very important relative to all the others in the analysis.

The standardized distributions in Table 3.2 indicate the impact of selected socio-demographic variables on the distribution of income. Although the data suggest causal patterns between income differences and selected characteristics, such inferences may be faulty or misleading because of the simplistic presentation of the data. Many of the independent variables are themselves correlated and this can cause distortions of the simple one-way patterns. For example, different provinces have very different rural/urban size compositions, work experience groups have different age and education characteristics, family sizes, age-sex-number of earner characteristics, etc., all of which may affect the between- and within-class relationships. By a process of elaboration, whereby the simple inferences suggested in Table 3.2 are examined further, we will consider the variables simultaneously.

3.6. Correlations of Income Differences by Family Size

Table 3.3⁶ summarizes the basic inequality information for all family units and separately by family size. The variable major source of income is not included in this table because it is subject to separate analysis in Section 3.8. Each term in the table represents a between-class T - B coefficient which, according to the T - B

decomposition formula, can be expressed as $\sum_g P_g \log \frac{P_g}{Y_g}$ (see Section 3.2. for definition of term). In each case, these between-class terms can be considered the amount of inequality that can be attributed to the variable(s) in question. The first eight rows of terms result from the simple one-way cross-classification of each variable. The ninth row represents the between-class coefficient from all variables considered simultaneously (i.e., a seven-or-eight-way table) and the last eight rows represent the between-class coefficients that result from not including each of the variables named. Thus, the difference between (i) the all variables together between-class coefficient, and (ii) the between-class coefficient from excluding one variable (say province) gives (iii) the differential impact of including that variable. This can be considered a measure of the importance of the variable — those that result in larger differentials can be called more important.

See footnote(s) on page 74.

This measure of importance gives a ranking of the variables in the multivariate context can be compared with the simple ranking of variables (as suggested by rows one through eight). A brief discussion of the results now follows.

TABLE 3.3. Summary of Between-class Variation of T-B Coefficient by Economic Family Unit Size, Canada, 1971

Selected standardization	All economic family units	Family unit size				
		1 person	2 persons	3 persons	4 persons	5 persons or more
Overall T-B coefficient	0.3359	0.3889	0.2751	0.2277	0.2000	0.2127
Between-class coefficient by:						
Province	0.0061	0.0056	0.0071	0.0070	0.0063	0.0084
Rural/urban size.	0.0081	0.0094	0.0153	0.0109	0.0111	0.0171
Age of head	0.0401	0.0435	0.0185	0.0102	0.0112	0.0078
Education of head	0.0240	0.0394	0.0341	0.0156	0.0187	0.0245
Work experience of head	0.0752	0.1465	0.0529	0.0160	0.0135	0.0153
Sex of head	0.0444	0.0148	0.0076	0.0074	0.0052	0.0041
Number of earners	0.1175	0.1267	0.0590	0.0413	0.0312	0.0329
Family unit size	0.0789	...	...	...	...	...
All variables together	0.2299	0.2940	0.1280	0.0996	0.0832	0.0872
Between-class coefficient excluding:						
Province	0.2209	0.2799	0.1196	0.0920	0.0757	0.0798
Rural/urban size.	0.2207	0.2811	0.1179	0.0910	0.0759	0.0795
Age of head	0.1889	0.1805	0.1069	0.0773	0.0695	0.0794
Education of head	0.2100	0.2690	0.1065	0.0847	0.0658	0.0681
Work experience of head	0.2202	0.2759	0.1194	0.0921	0.0769	0.0815
Sex of head	0.2241	0.2829	0.1220	0.0936	0.0795	0.0850
Number of earners	0.2155	0.2940	0.1087	0.0731	0.0674	0.0691
Family unit size	0.2088	...	...	...	...	...

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, computations by the author from unpublished data for 1970 income.

3.6.1. All Family Units

The simple standardization analysis in Table 3.3 (first eight terms in column one) agrees fairly closely with the results of Table 3.2.

In the context of the statistical framework existing between-class differences result in an inequality measure of 0.2299 or 68% of the actual inequality measure. This means that equalizing mean incomes on all the characteristics in the table would result in a T-B coefficient of .1060 (the overall T-B coefficient, .3359, minus the between-class coefficient .2299).

The ranking of the variables suggested by the incremental increases (the last eight rows of Table 3.3) put age of head as the most important followed by family

size, education of head and number of earners. This is a somewhat different pattern than the simple analysis suggests — age ranked fifth and work experience of head ranked third. One possible explanation for this result is fairly high correlations between work experience of head and number of family earners, likely the marginal increase of either one will be fairly small because the latter variation is common to both variables. This results in the high importance of age in the multivariate analysis. This problem is further examined in Section 3.6.2.

More generally, the simultaneous standardization indicates rather small marginal increases for each variable. Consequently, a smaller number of variables could in fact give very close to the same results. For example, excluding province, rural/urban size category, work experience of head or number of earners one at a time results in very little loss of information. This suggests searching for a minimum number of variables that give results close to the "All variables together" case. This procedure is followed for the family sizes in the modifications section.

Table 3.4 presents the rankings of the selected variables for each family size grouping from which one is able to compare the importance of the selected variables for each family size category.

TABLE 3.4. Ranking of Variables According to Simple Between-class Coefficients, Economic Family Units by Size, Canada, 1971

Variable	Family unit size				
	1 person	2 persons	3 persons	4 persons	5 persons or more
Province	7	7	7	6	7
Rural/urban size.	6	5	4	5	3
Age of head	3	4	5	4	5
Education of head	4	3	3	2	2
Work experience of head.	1	2	2	3	4
Sex of head	5	6	6	7	6
Number of earners	2	1	1	1	1

Source: Results derived from Table 3.3.

The effects of province of residence, and sex of head rank consistently near the bottom of the scale except that sex of head does rank slightly higher for unattached individuals. This is a reflection of the greater relative importance of

the number of female unattached individuals compared to female headed families (i.e., female unattached individuals account at least 50% of the unattached population but only about 10% of families are headed by females).

The work experience of the head of the unit is most important for unattached individuals but declines in importance as family size increases.

It seems reasonable to expect the impact of the head's income and labour force activity to be less in larger family units where the income of additional family members can become increasingly significant as a source of income. Although the head's work experience declines in importance, the impact of the number of earners remains consistently at the top. In the case of unattached individuals, number of earners and work experience are almost equivalent variables. The work experience variable is a finer breakdown of the number of earners variable. Consequently, the work experience variable has a slightly higher impact.

The education of the head appears to become more important for the larger family sizes. Education ranks fourth for unattached individuals and second for families of sizes four and five or more.

Another point of interest relates to how well the selected variable can explain or account for the observed inequality in income for the family sizes. The results (obtained from Table 3.3) of the multiple standardization expressed as a percentage of the actual T - B coefficient by family unit size are:

Family unit size	Percentage
1 person	75.6
2 persons	46.5
3 "	43.7
4 "	41.6
5 persons or more	41.0

The selected variables explain substantially more of the income variation for unattached individuals than they do for families. This is understandable to the extent that family income depends more on the characteristics of other family members that, by definition, do not exist for unattached individuals. This suggests it may be useful in future application to incorporate more variables relating to the characteristics of other family members (i.e., wife) that lead to income differentials. Table 3.5 ranks the variables on the basis of their marginal importance from the multivariate analysis.

TABLE 3.5. Ranking of Variables According to Multiple Between-class Coefficients, Economic Family Units by Size, Canada, 1971

Variable	Family unit size				
	1 person	2 persons	3 persons	4 persons	5 persons or more
Province	4	6	5	4	5
Rural/urban size	5	4	4	5	4
Age of head	1	2	2	3	3
Education of head	2	1	3	1	1
Work experience of head.	3	5	6	6	6
Sex of head	6	7	7	7	7
Number of earners	1	3	1	2	2

¹ Has no marginal impact after including work experience of head.

Source: Results derived from Table 3.3.

Age of head, number of earners and education of head are variables with consistently the highest marginal impact and sex of head, work experience of head (except for unattached) and province are the least important variables. The individual patterns by family size confirm the higher marginal importance of age of head compared to the simple standardization. However, this could be a reflection of the high correlation between number of earners and head's work experience.

3.6.2. Modifications

Two observations in the preceding analysis led to some further testing of different combinations of variables:

1. The very small marginal income increases for variables in the simultaneous analysis.
2. The fact that in the simultaneous analysis age of head and education of head appear more important than work experience and number of earners contrary to the findings in the simple one-way analysis.

Since many combinations of seven variables exist, some judicious choices were made based on some *a priori* considerations:

- (a) variables were deleted two at a time always having number of earners as one of the excluded variables (shown in Table 3.6); and

(b) certain two-, three- and four-way combinations of variables were constructed (shown in Table 3.7).

TABLE 3.6. Summary of Between-class Variation of T-B Coefficients by Economic Family Unit Size, Canada, 1971

Selected standardization	Family unit size				
	1 person	2 persons	3 persons	4 persons	5 persons or more
Overall T-B coefficient	0.3889	0.2751	0.2277	0.2000	0.2127
Between-class coefficients by:					
All variables together.	0.2940	0.1280	0.0996	0.0832	0.0872
All variables excluding number of earners	0.2940	0.1087	0.0731	0.0674	0.0691
All variables together excluding number of earners and:					
Province	0.2799	0.1013	0.0647	0.0603	0.0615
Rural/urban size	0.2811	0.0948	0.0639	0.0595	0.0600
Age of head	0.1805	0.0890	0.0501	0.0427	0.0510
Education of head	0.2690	0.0887	0.0586	0.0523	0.0531
Work experience of head . . .	0.1023	0.0766	0.0590	0.0539	0.0567
Sex of head	0.2829	0.0883	0.0596	0.0640	0.0672

Source: Statistics Canada, 1971 Census of Canada, computations by the author from unpublished data for 1970 income.

When number of earners is excluded, the work experience variable becomes the most important for family sizes one and two. However, in larger families, age and education of head in conjunction with number of earners rank at the top. This confirms the previous analysis that for larger family sizes work experience of head increasingly becomes a less important variable.

Table 3.7 indicates the between-class coefficients for selected combinations of the chosen variables. These can be compared to the "All variables together" situation and give some insight as to the extent that a small number of variables are able to account for observed money income inequality.

For family size one, the four selected variables are almost as good as the six variables. The further exclusion of sex results in very little loss of information. Thus, the variables combining work experience, age, education can account for about as much inequality as the "All variables together" case for family size one. The other three-way selection of variables is not nearly as good as the work experience, age, education combination.

TABLE 3.7. Between-class Variation of T-B Coefficients for Selected Combinations of Variables, Economic Family Units by Size, Canada, 1971

Selected combination of variables	Family unit size				
	1 person	2 persons	3 persons	4 persons	5 persons or more
All variables together	0.2940	0.1280	0.0996	0.0832	0.0872
Work experience:					
Age and education	0.2654	0.0843	0.0446	0.0506	0.0506
Age and sex	0.2497	1	1	1	1
Education and sex	0.1669	1	1	1	1
Age, sex and education	0.2728	1	1	1	1
Number of earners:					
Age and education	1	0.0990	0.0727	0.0611	0.0651
Age, education and work experience	1	0.1066	0.0815	0.0688	0.0710

¹ These standardizations were not done.

Source: Statistics Canada, 1971 Census of Canada, unpublished data and computations by author.

For the other family sizes, it is apparent that number of earners, age, education and work experience combined can explain almost as much inequality as "All variables together". Also worth noting is the greater importance of the number of earners variable compared to work experience of the head.

3.7. Pattern of Within-group Inequality

It was mentioned regarding Table 3.1 that wide variations in some of the within-group variations by selected characteristics (for example, by number of earners) may be attributed to the different composition of the categories according to other income related variables. Thus, inequality measures calculated for groups defined by a greater number of characteristics can be expected to show a tendency towards greater equalization of inequality measures. Tables 3.8 and 3.9 present the T-B coefficients within age/family size groups and age/number of earners groups.

From Table 3.8, there appears to be some narrowing of the within-group pattern by number of earners for the two oldest age groups but not for the others.

Within number of earners categories there is less of a spread by age for three of the categories but not for the zero earner group. Thus the evidence is not very conclusive.

**TABLE 3.8. Summary of T-B Coefficients by Number of Earners
and Age of Head in Economic Family Unit, Canada, 1971**

Age of head	Total	Number of earners			
		None	One	Two	Three or more
Total	0.3359	0.3529	0.2870	0.1395	0.1247
15 - 24 years	0.3674	0.6661	0.3421	0.1058	0.1171
25 - 34 "	0.2062	0.5667	0.1923	0.0941	0.0897
35 - 44 "	0.2325	0.4987	0.2323	0.1293	0.1116
45 - 54 "	0.2789	0.4850	0.2824	0.1591	0.1214
55 - 64 "	0.3694	0.5031	0.3095	0.1830	0.1385
65 - 69 "	0.4109	0.3252	0.2839	0.1940	0.1441
70 years and over	0.3917	0.2582	0.2602	0.1952	0.1609

Source: Statistics Canada, 1971 Census of Canada, unpublished data for 1970 income.

Table 3.9 provides the same types of partial explanations. One can only suggest that these classifications make some of the family groups more homogeneous but others more heterogeneous. Further classifications, although desirable, become impracticable even with a data source such as the census.

3.8. Major Source and Composition of Income and the Distribution of Income

Family income tends to accrue from a variety of sources each of which has its own generating mechanism. This mechanism may be dependent on the other sources of income (for example, the level of some transfer payments depends on the amount of other income sources received by the family or individual). A full examination of income inequality requires a methodology to link the generation of income by source to total family income levels in conjunction with the various demographic and family characteristic influences described earlier in this section. Unfortunately, this analysis is beyond the scope of this report and we will have to be satisfied with a partial analysis of income differences by major source of income and income composition by selected characteristics. It is possible to

TABLE 3.9. Summary of T-B Coefficients by Economic Family Unit Size
and Age of Head, Canada, 1971

Family unit size	Total	Age of head		
		15-24 years	25-34 years	35-44 years
Total	0.3359	0.3674	0.2062	0.2325
1 person	0.3889	0.3737	0.2498	0.3359
2 persons	0.2751	0.2155	0.1794	0.2659
3 "	0.2277	0.2011	0.1878	0.2270
4 "	0.2000	0.1988	0.1621	0.1826
5 "	0.2036	0.2496	0.1791	0.1863
6 "	0.2134	0.3353	0.1966	0.1969
7 "	0.2235	0.5257 ¹	0.2223	0.2076
8 "	0.2268	0.2830 ¹	0.2390	0.2057
9 "	0.2340	0.3602 ¹	0.2466	0.2225
10 persons or more	0.2353	0.2777 ¹	0.2816	0.2149
Age of head				
	45-54 years	55-64 years	65-69 years	70 years and over
Total	0.2789	0.3694	0.4109	0.3917
1 person	0.3792	0.4425	0.3570	0.2803
2 persons	0.2541	0.2865	0.3133	0.2708
3 "	0.2192	0.2446	0.2576	0.2365
4 "	0.2001	0.2412	0.2479	0.2342
5 "	0.2024	0.2396	0.2463	0.2208
6 "	0.2137	0.2371	0.2203	0.1927
7 "	0.2173	0.2402	0.2382	0.2073
8 "	0.2269	0.2285	0.2451	0.2179 ¹
9 "	0.2222	0.2409	0.3021 ¹	0.2059 ¹
10 persons or more	0.2189	0.2772	0.2369 ¹	0.2152 ¹

¹ Relatively small sample sizes, around 250-300.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

identify six fairly homogeneous income sources: wages and salaries, non-farm self-employment income, farm self-employment income, government transfer payments, investment income, and miscellaneous income.

Table 3.10 summarizes the main features of the population according to income type by classifying family units by major source of income. Wages and salaries are the major source of income for the majority of Canadian families (72.8%) followed by government transfer payments (13.0%). The importance of government transfer payments is undoubtedly a reflection of the role of old age pensions as an income source for elderly Canadian families.

The pattern of within-group inequality suggests quite different degrees of inequality for the income sources. Generally, the degree of inequality is low for families in the wages and salaries and government transfer payments major source groups and high in the other income source groups.

The significance of these differences can only be determined by a more detailed examination of the income pattern by major source and other socio-demographic characteristics.

Table 3.10 describes the distribution of family units by major source within the socio-demographic and economic characteristics analyzed previously in this section. There are some notable variations in the distribution of selected population groups by major source of income:

1. A large proportion of male headed family units have wages and salaries as their major source of income; 78.2% for male headed units compared with 51.2% for female headed family units who are more concentrated in the government transfer payments major source group (29.8% against 8.7% for male headed families).
2. As age of head increases the proportion of family units with wages and salaries as major source of income declines markedly with corresponding increases in the proportion of units in the investment and government transfer payment categories. In fact 85.4% of family units with head aged 15 - 24 years had as their major source wages and salaries whereas only 17.9% of family units, in the eldest category, had wages and salaries as major source. In the eldest age group 11.4% and 60.1% of family units had the major sources of interest and dividends and government transfer payments respectively. The comparable data for family units with young heads were 0.3% and 3.7% respectively.
3. As expected in family units where the head's labour force activity was significant, wages and salaries and self-employment income were the major source for about 98% of family units. For the non-working group major source government transfer payments constitutes 54.8% of the group.
4. By income deciles, the importance of the various income sources is clear. Wages and salaries are the major source of income for only 23.3% of the families in the lowest decile and for 93.0% and 84.8% of families in the two top deciles. Transfer payments are the major source of income for 42.4% and 51.7% of income in the bottom two deciles and decline sharply in importance thereafter.

TABLE 3.10. Percentage Distributions of Economic Family Units by Major Source of Income
for Selected Characteristics, Canada, 1971

Selected characteristics	Total	Major source of income in 1970					
		Wages and salaries	Non-farm self-employment	Farm self-employment	Investment income	Government transfer payments	Other income
Canada	100.0	72.8	4.2	2.5	3.0	12.9	2.3
Province:							
Newfoundland	100.0	70.8	4.9	0.2	0.8	20.2	1.4
Prince Edward Island	100.0	61.2	6.8	5.3	1.8	21.4	2.1
Nova Scotia	100.0	72.2	4.4	0.7	2.1	16.3	2.6
New Brunswick	100.0	72.2	3.9	1.0	1.9	16.3	2.4
Quebec	100.0	74.2	4.1	1.5	2.3	12.8	2.0
Ontario	100.0	75.8	4.0	1.5	3.4	10.9	2.5
Manitoba	100.0	67.8	4.2	5.4	3.1	15.2	2.3
Saskatchewan	100.0	54.6	4.9	14.9	4.3	17.5	1.9
Alberta	100.0	70.3	4.6	6.1	3.0	12.5	1.7
British Columbia	100.0	71.3	4.6	0.8	4.0	14.4	2.9
Rural/urban size:							
Rural non-farm	100.0	65.3	6.1	1.4	2.8	20.2	2.0
Rural farm	100.0	41.1	5.8	39.7	2.9	8.3	0.8
500,000 and over	100.0	78.0	3.6	0.1	3.0	10.5	2.5
100,000-499,999	100.0	77.4	3.3	0.2	3.1	11.2	2.7
30,000-99,999	100.0	76.2	3.5	0.2	3.0	12.2	2.5
10,000-29,999	100.0	74.7	4.0	0.6	3.1	12.7	2.4
5,000-9,999	100.0	73.5	4.3	0.5	3.0	14.2	2.2
2,500-4,999	100.0	70.3	4.9	0.9	3.7	16.2	2.2
1,000-2,499	100.0	66.9	5.5	1.1	3.5	18.4	2.2
Sex of head:							
Male	100.0	78.2	4.9	3.0	2.1	8.7	1.8
Female	100.0	51.2	1.5	0.6	6.9	29.8	4.2
Age of head:							
15-24 years	100.0	85.4	1.3	0.4	0.3	3.7	0.8
25-34 "	100.0	88.7	3.5	1.5	0.4	3.7	0.6
35-44 "	100.0	84.0	6.0	3.0	0.6	4.4	0.7
45-54 "	100.0	81.2	5.8	3.7	1.4	5.3	0.9
55-64 "	100.0	71.7	5.2	3.9	4.9	8.4	2.9
65-69 "	100.0	39.4	3.5	2.5	9.4	35.2	9.1
70 years and over	100.0	17.9	1.6	1.2	11.4	60.1	7.6

TABLE 3.10. Percentage Distributions of Economic Family Units by Major Source of Income
for Selected Characteristics, Canada, 1971 — Concluded

Selected characteristics	Total	Major source of income in 1970						
		Wages and salaries	Non-farm self-employment	Farm self-employment	Investment income	Government transfer payments	Other income	No income
Education of head:								
No schooling ¹	100.0	50.2	2.9	1.4	3.2	30.9	2.1	9.3
Elementary:								
1-4	100.0	49.7	3.6	2.8	3.6	34.6	2.6	3.1
5 or more	100.0	64.9	4.5	4.1	3.5	18.8	2.4	2.0
High school:								
1	100.0	74.8	4.3	3.2	2.6	10.9	2.0	2.2
2	100.0	77.9	4.0	2.3	2.6	9.2	2.1	1.9
3	100.0	81.5	3.6	1.6	2.7	6.6	2.1	2.0
4	100.0	82.6	3.3	1.3	2.7	6.1	2.1	2.0
5	100.0	77.8	3.7	0.7	4.4	8.0	3.6	1.8
University:								
1 and 2	100.0	84.3	3.4	1.3	2.9	3.9	2.5	1.9
3	100.0	85.6	3.5	0.7	2.2	4.0	2.1	2.0
4 or more	100.0	81.6	4.0	0.9	2.6	6.9	1.9	2.1
Degree	100.0	83.6	7.8	0.3	2.5	1.6	2.5	1.7
Work experience of head:								
Full time	100.0	89.3	5.0	3.6	0.6	0.8	0.3	0.3
Part time	100.0	83.8	5.3	1.8	1.9	5.3	1.5	0.5
Did not work	100.0	15.1	0.8	0.5	10.8	54.8	8.5	9.5
Number of earners:								
None	100.0	—	—	—	12.1	64.4	9.6	14.0
One	100.0	82.8	5.5	3.6	1.9	5.0	1.4	—
Two	100.0	91.0	4.4	2.2	0.7	1.2	0.4	—
Three or more	100.0	91.9	4.4	2.2	0.6	0.7	0.3	—
Family unit size:								
1 person	100.0	54.7	2.1	1.0	5.6	25.0	3.7	7.9
2 persons	100.0	67.2	3.9	2.4	5.0	16.9	4.2	0.5
3 "	100.0	83.3	4.4	2.6	1.6	6.7	1.3	0.2
4 "	100.0	86.5	5.3	2.7	0.8	3.9	0.7	0.1
5 "	100.0	85.3	6.1	3.4	0.7	3.9	0.6	0.1
6 "	100.0	83.5	6.5	4.3	0.6	4.6	0.5	0.1
7 "	100.0	81.4	6.2	4.8	0.5	6.5	0.6	0.1
8 "	100.0	79.2	6.1	5.5	0.5	8.2	0.5	0.1
9 "	100.0	76.4	6.2	5.8	0.3	10.5	0.6	0.1
10 persons or more	100.0	73.0	5.1	5.8	0.3	15.1	0.6	0.1
Decile class (1970 income):								
Lowest	100.0	23.3	2.9	4.8	3.0	42.4	1.5	22.2
2nd	100.0	32.6	2.9	3.9	5.2	51.7	3.8	—
3rd	100.0	56.4	4.8	4.6	5.6	23.6	5.1	—
4th	100.0	75.9	4.8	3.4	4.2	7.6	4.1	—
5th	100.0	86.0	4.2	2.2	2.7	2.4	2.5	—
6th	100.0	90.4	3.7	1.5	2.0	1.0	1.5	—
7th	100.0	92.3	3.3	1.2	1.5	0.5	1.1	—
8th	100.0	93.1	3.3	1.0	1.4	0.2	0.9	—
9th	100.0	93.0	3.6	1.0	1.5	0.2	0.9	—
Highest	100.0	84.8	8.7	1.4	3.4	0.1	1.6	—

¹ Kindergarten category has been excluded.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE 3.11. Composition of 1970 Income of Economic Family Units by Selected Characteristics, Canada, 1971

Selected characteristics	Total	Income components					
		Wages and salaries	Non-farm self-employment	Farm self-employment	Investment income	Government transfer payments	Other income
per cent							
Canada	100.0	78.8	6.0	1.4	4.7	6.6	2.4
Province:							
Newfoundland	100.0	77.9	5.8	0.2	1.9	12.6	1.6
Prince Edward Island	100.0	67.9	8.1	3.8	3.9	13.8	2.5
Nova Scotia	100.0	77.5	5.6	0.5	4.0	9.5	2.9
New Brunswick	100.0	77.8	5.3	0.7	3.4	10.2	2.6
Quebec	100.0	79.8	5.9	1.0	4.2	6.8	2.3
Ontario	100.0	80.3	5.7	0.9	5.1	5.4	2.5
Manitoba	100.0	76.7	5.8	2.6	4.8	7.7	2.4
Saskatchewan	100.0	66.8	6.8	9.1	5.7	9.6	2.1
Alberta	100.0	77.3	7.0	3.3	4.5	6.1	1.9
British Columbia	100.0	78.0	6.5	0.5	5.5	6.9	2.7
Rural/urban size:							
Rural non-farm	100.0	74.6	7.3	0.9	3.9	11.1	2.2
Rural farm	100.0	50.7	7.2	27.4	5.1	8.1	1.5
50,000 and over	100.0	81.5	5.5	0.1	5.2	5.1	2.5
100,000-499,999	100.0	81.3	5.5	0.2	4.8	5.7	2.6
30,000-99,999	100.0	80.9	5.7	0.2	4.4	6.3	2.4
10,000-29,999	100.0	80.6	5.8	0.5	4.3	6.6	2.3
5,000-9,999	100.0	79.9	6.2	0.4	4.2	7.2	2.1
2,500-4,999	100.0	77.4	7.0	0.6	4.7	8.1	2.2
1,000-2,499	100.0	75.5	7.4	1.0	4.5	9.4	2.2
Sex of head:							
Male	100.0	80.5	6.4	1.5	4.1	5.4	2.1
Female	100.0	64.3	2.3	0.6	10.5	17.1	5.3
Number of earners:							
None	100.0	-	-	-	27.7	54.9	17.4
One	100.0	78.8	7.3	1.8	4.5	5.5	2.1
Two	100.0	86.0	5.3	1.1	2.9	3.3	1.3
Three or more	100.0	84.9	5.8	1.4	3.1	3.4	1.4
Family size:							
1 person	100.0	71.6	3.5	0.7	8.3	12.0	4.0
2 persons	100.0	73.5	4.6	1.2	8.0	8.5	4.3
3 "	100.0	82.6	5.1	1.3	4.1	4.8	2.1
4 "	100.0	84.2	6.5	1.3	2.9	3.8	1.3
5 "	100.0	82.1	7.9	1.5	2.8	4.4	1.2
6 "	100.0	79.9	8.7	2.0	2.6	5.6	1.2
7 "	100.0	78.6	8.1	2.5	2.3	7.2	1.4
8 "	100.0	76.7	8.0	3.0	2.0	8.8	1.5
9 "	100.0	75.0	7.9	3.5	1.6	10.6	1.3
10 persons or more	100.0	72.6	6.4	3.6	1.7	14.3	1.3

TABLE 3.11. Composition of 1970 Income of Economic Family Units by Selected Characteristics, Canada, 1971 - Concluded

Selected characteristics	Total	Income components					
		Wages and salaries	Non-farm self-employment	Farm self-employment	Investment income	Government transfer payments	Other income
per cent							
Age of head:							
15-24 years	100.0	93.9	1.7	0.3	0.6	2.6	0.9
25-34 "	100.0	90.0	4.3	0.7	1.1	2.9	0.9
35-44 "	100.0	83.3	7.9	1.4	2.2	4.2	1.1
45-54 "	100.0	81.5	7.2	1.8	3.7	4.2	1.5
55-64 "	100.0	76.6	6.3	1.9	7.7	4.5	3.0
65-69 "	100.0	47.8	5.1	1.8	14.4	20.8	10.0
70 years and over	100.0	29.0	3.3	1.4	19.7	36.2	10.3
Education of head:							
No schooling!	100.0	71.6	5.0	1.0	5.6	14.3	2.6
Elementary:							
1-4	100.0	64.9	5.0	2.3	5.8	18.8	3.1
5 or more	100.0	74.1	5.5	2.8	4.8	10.3	2.5
High school:							
1	100.0	80.4	5.0	1.9	3.9	6.7	2.1
2	100.0	82.3	4.6	1.3	3.9	5.7	2.2
3	100.0	84.2	4.2	0.8	4.2	4.4	2.2
4	100.0	84.9	4.0	0.7	4.3	4.0	2.2
5	100.0	81.4	4.5	0.4	6.3	4.3	3.1
University:							
1 and 2	100.0	84.3	4.2	0.4	5.4	3.2	2.5
3	100.0	85.0	4.3	0.3	4.9	3.2	2.4
4 or more	100.0	83.4	5.2	0.4	4.8	4.1	2.1
Degree	100.0	76.0	14.3	0.1	5.7	1.7	2.2
Work experience of head:							
Full time	100.0	85.8	6.0	1.6	3.0	2.6	1.1
Part time	100.0	78.5	7.4	1.2	4.2	6.4	2.3
Did not work	100.0	28.5	1.6	0.6	19.4	37.6	12.4
Decile class (1970 income):							
Lowest	100.0	46.3	- 21.6	- 20.9	6.5	86.7	3.0
2nd	100.0	33.8	2.6	3.1	7.2	48.7	4.6
3rd	100.0	54.8	4.3	3.6	6.7	25.3	5.3
4th	100.0	71.6	4.4	2.7	5.1	12.4	3.9
5th	100.0	81.0	3.9	1.8	3.7	7.1	2.6
6th	100.0	84.7	3.6	1.3	3.2	5.4	1.9
7th	100.0	86.7	3.4	1.1	2.9	4.3	1.6
8th	100.0	87.4	3.5	1.0	3.0	3.5	1.5
9th	100.0	87.2	4.0	1.0	3.3	2.9	1.6
Highest	100.0	74.2	12.2	1.6	7.4	1.9	2.7

¹ Kindergarten category has been excluded.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

Table 3.10 groups families according to their major source of income. Even though a family has as its major source wages and salaries, the presence of other income sources may have an important impact on the income position of a family. Table 3.11 presents the shares of the various income components accruing to families by selected characteristics. This table indicates that some of the non-wage income sources are more important than suggested by the major source comparisons in Table 3.10.

3.8.1. Income Sources and Income Inequality

Although Tables 3.10 and 3.11 provide estimates of the number of family units receiving different types of income and the importance of the income aggregates as sources of family income by selected socio-economic characteristics, it is not clear from these tables how the income distribution is affected by the various income components. This is a very difficult problem that depends on the relative sizes of the income components and the distribution of each component vis-à-vis all the others. Let us suppose there are only two income components, wages and salaries and government transfer payments, the sum of which constitutes total income. It is clear that if one of these income components is very large (as wages and salaries are generally) then that component will likely have the greatest impact on the shape of the final distribution. This partially explains why the income equalizing effect of government transfer payments is slight in aggregate. Secondly, the impact on the total distribution will be affected by the joint distribution of the two components. One can identify two extreme cases — if the high incomes of one component received the high income from the other component the distribution will be more unequal than if the high income of one component receives the low income of the other. Thus for government transfer payments to have a significant equalizing impact, it needs to be distributed more than proportionately to those with low income from the other source.

A partial way to examine the impact of an income component is to compare the money income distribution to the distribution in the absence of the component in question. For example, what happens to the income distribution with and without the inclusion of government transfer payments? This approach has a weakness in the fact that what would be the distribution in the absence of government transfer payments is unknown. Since government transfer payments are in aggregate a relatively small component of total money income, the distributional change in its absence will be slight unless they are heavily concentrated at the bottom of the distribution.

Table 3.12 indicates that government transfer payments do make the current income more equal as seen by the difference between row six and row one. The effect is not large because government transfer payments are a relatively small component of total income. However, it is interesting to note the very large differences in income inequality depending on whether the zero incomes are included.

Note .4956 for the Gini coefficient for wages and salaries where zeros are included and .3632 where the zeros are not included. If government transfer payments were the only other source of income, both of these distributions could be interpreted as hypothetical alternatives in the absence of the government sector. Very different conclusions result from these two alternatives.

TABLE 3.12. Gini Coefficients for Selected Income Components and Component Combinations for Economic Family Units, Canada, 1971

Components of 1970 income	Gini coefficient
Total income	0.4177
Wages and salaries (including no income) ¹	0.4956
Wages and salaries (excluding no income) ¹	0.3632
Wages and salaries + self-employment (including no income) ¹	0.4805
Wages and salaries + self-employment (excluding no income) ¹	0.3811
Total income (excluding government transfer payments)	0.4318

¹ For comparison purposes the Gini coefficient has been calculated with and without those family units receiving the income in question.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

FOOTNOTES

¹ The methodology is described in fuller detail in *Income Inequality: Statistical Methodology and Canadian Illustrations*, Catalogue 13-559.

² Another approach has been used in some regression applications (mainly with earnings distributions) where R^2 is interpreted as the amount of inequality "explained" and $1-R^2$ is the amount of inequality that would remain if all model income differences were eliminated. This approach, though analytically compact, has built-in assumptions about the residual variation (which is the inequality in the absence of between-class differences) and the implicit choice of the inequality measure, usually the Variance, or the Variance of Logarithms, depending on the model.

³ This has enormous saving in the size of the required tables for the analysis. Without income class as a variable, it is possible that tables can be smaller by a factor of 94 (the number of income classes incorporated into the analysis).

⁴ Self-employment income provides a problem here as it includes returns to capital as well as labour and these components cannot be separated.

⁵ The additional earner may be the wife or any other member of the family unit. Among families of two or more, 50% of families have one or more earners which suggests that the notion of the predominant one earner family is declining in importance.

⁶ Theoretically, the standardized coefficient of Table 3.2 should equal the difference between the overall T-B coefficient and the between-class coefficients. The main reason for differences would be the fact that the results of Table 3.2 are not exact but only an approximation derived from grouped data. (In addition, the family size grouping in Table 3.2 is one to 10 and over and in Table 3.3 it is one to five and over.)

CHAPTER 4

INCOME INEQUALITY AND CHANGES IN THE SOCIO-DEMOGRAPHIC STRUCTURE OF THE POPULATION, 1961 AND 1971 CENSUSES OF CANADA

4.1. Income Inequality in Socio-demographic Groups

The introduction to this report referred to the importance of monitoring changes in the income distribution over a period of time and attempting to isolate some of the factors associated with the change. In this way, a firmer understanding of the income distribution process may be obtained. This exercise is especially crucial today because the evidence from surveys of consumer finances suggests less equality of money income in the last half of the 1960's compared to the first half (see Love and Wolfson, 1976, p. 75). This runs counter to the notion that increased expenditure by the government on social security programs should have an equalizing effect on the distribution of money income. This does not necessarily mean the society is less just or that government expenditure is not reducing income inequality. It may be that other forces are influencing the income distribution so as to offset the equalizing effect of increased government expenditure. In fact, government policy itself may set into motion influences which may increase observed inequality. For example, an increase in old age pensions or unemployment insurance benefits may result in low income individuals, previously in higher income family units, setting up separate low income households. The result would be an increase in measured income inequality. This phenomenon has been referred to as "undoubling". An attempt to isolate the effects of undoubling has been made by limiting the time period analysis to the more restricted census family definition. This represents an attempt to make the unit of analysis insensitive to economic conditions.

Census data from the 1961 and 1971 Censuses of Canada should have provided a unique opportunity to examine changes in the income distribution over the decade. However, as Appendix A explains, the data from the two censuses are not considered adequate for comparing income distributions of the population.¹ As a result, within-group inequality from the 1961 Census is not compared with the 1971 Census. The problem also has implications for the nature of the standardization process as described later in this chapter.

See footnote(s) on page 87.

TABLE 4.1. Inequality Summary by Selected Characteristics¹ for Restricted Census Family Units,
Canada, 1961 and 1971

Selected characteristics	Gini coefficient	T-B coefficient	Coefficient of variation	Restricted census family units		Mean income ² of family units	
				1961 percentage distribution	1961-71 percentage increase	1961 mean income	1961-71 percentage increase in mean
Canada	0.4721	0.4239	1.0060	100.0	36.9	3,773	72.8
Province:							
Newfoundland	0.5031	0.4338	1.1179	2.4	26.1	2,434	82.7
Prince Edward Island	0.4918	0.4333	1.0598	0.4	43.6	2,589	78.4
Nova Scotia	0.4852	0.4282	1.0555	4.1	24.7	2,898	79.6
New Brunswick	0.4843	0.4226	1.0102	3.0	29.1	2,836	72.9
Quebec	0.4840	0.4150	1.0494	28.9	37.0	3,470	70.1
Ontario	0.4540	0.4126	0.9630	36.6	38.3	4,205	74.8
Manitoba	0.4664	0.4185	0.9739	4.8	25.5	3,686	65.5
Saskatchewan	0.4952	0.4669	1.0295	3.9	20.3	3,440	56.4
Alberta	0.4574	0.4173	0.9641	6.3	43.9	4,105	70.2
British Columbia	0.4538	0.4086	0.9552	9.8	48.9	4,046	72.0
Rural/urban size:							
Rural total	0.4907	0.4272	1.0318	18.6	23.5	2,773	79.6
100,000 and over	0.4649	0.4177	1.0032	52.2	41.6	4,220	69.3
30,000-99,999	0.4607	0.4153	0.9586	10.5	25.0	3,840	67.8
10,000-29,999	0.4553	0.4011	0.9142	6.5	70.9	3,647	78.1
5,000-9,999	0.4585	0.4039	0.9214	3.7	43.9	3,621	72.1
2,500-4,999	0.4681	0.4063	0.9812	3.9	39.4	3,452	72.3
1,000-2,499	0.4720	0.4068	0.9651	4.7	9.5	3,159	74.7
Sex of head:							
Male	0.4153	0.3402	0.8891	76.1	33.2	4,424	76.4
Female	0.5164	0.4150	1.1166	23.9	48.7	1,699	67.7
Age of head:							
15-24 years	0.5609	0.4961	1.1057	18.1	76.1	1,889	52.2
25-34 "	0.3378	0.2366	0.6581	20.3	30.1	4,337	82.1
35-44 "	0.3534	0.2531	0.7564	19.0	16.3	5,135	83.4
45-54 "	0.3929	0.3065	0.8594	15.9	26.1	4,937	84.9
55-64 "	0.4593	0.4024	1.0496	11.6	43.4	3,927	84.7
65-69 "	0.4925	0.4172	1.3047	4.9	36.6	2,700	87.6
70 years and over	0.4560	0.3349	1.3720	10.1	28.8	1,966	79.1

See footnote(s) at end of table.

TABLE 4.1. Inequality Summary by Selected Characteristics¹ for Restricted Census Family Units,
Canada, 1961 and 1971 — Concluded

Selected characteristics	Gini coefficient	T-B coefficient	Coefficient of variation	Restricted census family units		Mean income ² of family units	
				1961 percentage distribution	1961-71 percentage increase	1961 mean income	1961-71 percentage increase in mean
							dollars
Education of head:							
No schooling ³	0.5568	0.5089	1.2726	1.5	130.2	1,496	217.1
Elementary:							
1-4	0.4741	0.3733	1.0433	7.4	- 2.3	2,196	79.9
5 or more	0.4313	0.3462	0.8852	35.2	5.8	3,125	77.4
High school:							
1	0.4127	0.3288	0.8212	9.0	37.1	3,545	78.9
2	0.4185	0.3401	0.8358	11.6	34.1	3,905	70.2
3	0.4505	0.3876	0.9198	8.8	63.8	4,073	60.3
4	0.4756	0.4466	0.9485	9.9	116.2	4,144	52.2
5	0.4649	0.4606	0.9689	7.5	- 15.1	4,579	69.9
University:							
1 and 2	0.5273	0.5744	1.0991	3.3	129.1	4,455	44.1
3	0.5586	0.5948	1.2113	0.8	54.5	4,651	27.4
4 or more	0.4936	0.4634	1.0503	0.6	20.1	5,324	25.4
Degree	0.4374	0.3985	0.9206	4.3	112.1	8,896	45.9
Number of earners:							
None	0.5916	0.3787	1.6704	19.2	49.5	1,064	73.6
One	0.4252	0.3949	0.9699	63.9	28.8	3,962	61.5
Two	0.2596	0.1231	0.5810	15.8	80.0	6,111	82.2
Three	0.2601	0.1192	0.5888	1.0	73.7	6,644	95.9
Four or more	0.2552	0.1138	0.5610	0.1	116.3	7,008	99.4
Family unit size:							
1 person	0.5300	0.4373	1.1658	42.1	45.8	1,946	63.8
2 persons	0.3844	0.2880	0.8483	20.0	44.9	4,673	82.3
3 "	0.3310	0.2393	0.7234	11.4	31.7	5,058	80.7
4 "	0.3070	0.1955	0.6830	11.4	29.6	5,485	80.2
5 "	0.3207	0.2025	0.7201	7.2	21.5	5,641	82.5
6 "	0.3318	0.2133	0.7663	3.9	12.4	5,520	83.8
7 "	0.3364	0.2171	0.7785	1.9	4.0	5,156	81.1
8 "	0.3470	0.2250	0.8228	1.0	- 16.9	4,882	80.3
9 "	0.3448	0.2204	0.8154	0.5	- 25.6	4,700	73.3
10 persons or more	0.3333	0.2064	0.7660	0.6	- 38.6	4,426	66.3

¹ Work experience of head has not been included as a variable since the concept is not comparable for the 1961 and 1971 Censuses. In 1961, weeks worked was for wages and salaries only whereas in 1971 weeks worked referred to all weeks worked whether for wages or salary or in self-employment or unpaid family work.

² For 1961 the reported income is for the 1960-61 period and for 1971 the reported income is the 1970 income.

³ Kindergarten category excluded.

Source: Statistics Canada, 1961 and 1971 Censuses of Canada, unpublished data.

4.2. Changes in the Socio-demographic Structure of the Population

Between the censuses of 1961 and 1971, there have been significant changes in the characteristics of the restricted census family population (see Table 4.1):

1. Family units became more concentrated in urban areas. The number of family units increased by 23.5% in rural areas and 41.6% in centres with a population of 100,000 or more.
2. Family units headed by females increased at a faster rate than for males (48.7% versus 33.2%) while average income increases were higher for male headed family units.
3. Family units headed by young persons increased at a much faster rate than those headed by older persons, but the average income increase of these young family units lagged behind the rest of the families.
4. Multi-earner families became much more prevalent in 1971 and their average income increased at a faster rate.
5. Smaller family unit sizes became much more prevalent and some larger family sizes declined in numbers.

All of the above facts change the relative size of the various family categories and, all other things remaining unchanged, have an impact on the level of aggregate inequality. As well, these socio-demographic changes influence the relative income receiving power of different groups and consequently the level of income inequality between the 1961 and 1971 Censuses. Undoubtedly, some of these changes have been equalizing and others not so. The empirical analysis provides some insights into the relevance and importance of these population and mean income shifts in relation to the changing pattern of overall income inequality.

For purposes of analytical simplification, there are three distinct situations when looking at the change in inequality between two years.

In the first instance, it is possible that inequality change over the decade can be explained solely by population shifts. More precisely, this means no change in within-group inequality and exactly proportional shifts in average family income for the family units on the basis of the selected characteristics. That is, if there were no changes in inequality within age groups nor any changes in the pairwise comparison of the mean income between age groups but a change in the age distribution, then measured inequality could change.

A second possibility is that the change in income inequality between 1960 and 1970 has been affected by changes in the relative income between groups (as an example, the age-income profile may have changed its shape).

A third situation combines increasing inequality within the sub-group with no change in the weights and relative means of the population. This implies that

the various categorizations of the population have been for naught and the inequality change is due to factors other than those analyzed. This result would indicate a lack of relationship between demographic changes or mean income profiles and the aggregate level of income inequality.

The real situation is not as simple as any of the three illustrations but some combination of the three influences. This analysis gives a better understanding of how the above changes have affected income inequality between 1960 and 1970. The method is analogous to the standardization procedure described in Chapter 3.

4.3. The Standardization Procedure²

The method of isolating for the above shifts is an extension of the standardization and decomposition procedure described in Chapter 3.

The standardization procedure will be described in general and then mathematically for the T - B coefficient.

Assuming reliable distribution data were available for both 1961 and 1971 Censuses, one approach is to start with the 1961 Census distribution by a characteristic (say age) and determine answers to the following questions:

What would inequality have been in 1970 if:

- (a) only the age structure had changed from 1960 - 70?
- (b) only the mean income within age groups had changed from 1960 - 70?
- (a) + (b) both the age structure and mean income by age had changed from 1960 - 70?
- (c) only inequality within age groups had changed?

In the first case, the numbers in each age group would be changed to the 1971 levels, the distributions added over age groups and the inequality measure recalculated.

In the second case, the mean for each age group would be changed to the 1971 level, the distributions re-added and the inequality measure recalculated.

In the third case operations (a) and (b) are done simultaneously. This may be summarized as the total between-class effect.

In the fourth case, the 1961 means and relative populations would be combined with the 1971 shapes of the constituent distributions. Because of data difficulties described in Appendix A, this procedure has not been implemented and the following analysis is incomplete in this respect.

See footnote(s) on page 87.

This process has an algebraic representation with the use of the T-B coefficient.

We know

$$T \cdot B |Y_i| = \sum_g p_{gi} \log \frac{\mu_i}{\mu_{gi}} + \sum_g p_{gi} T \cdot B_{gi}$$

where

p_g = proportion of population in group g

μ = mean income

μ_g = mean income of gth group

i = refers to year.

Changing the population shares from year one to year two affects both the within-class and between-class terms:

$$T \cdot B_a = \sum_g p_{g2} \log \frac{\mu_1^*}{\mu_{g1}} + \sum_g p_{g2} T \cdot B_{g1}$$

where

$$\mu_1^* = \sum_g p_{g2} \mu_{g1}$$

In the case of mean income changes, the expression becomes:

$$T \cdot B_{(b)} = \sum_g p_{g1} \log \frac{\mu_2^*}{\mu_{g2}} + \sum_g p_{g1} T \cdot B_{g1}$$

where

$$\mu_2^* = \sum_g p_{g1} \mu_{g2}$$

In the case where both change, the expression becomes:

$$T \cdot B_{(a+b)} = \sum_g p_{g2} \log \frac{\mu_2}{\mu_{g2}} + \sum_g p_{g2} T \cdot B_{g1}$$

where only within-class changes occur:

$$T \cdot B_{(c)} = \sum p_{g1} \log \frac{\mu_1}{\mu_{g1}} + \sum p_{g1} T \cdot B_{g2}$$

By substituting the various year two (1971) values into the above equations an estimate of the effect of the year one/year two change in the variable under consideration is obtained.

The problems with the 1961 Census data discussed in Appendix A preclude a straightforward application of such a procedure. Instead, a "backward" standardization procedure will be used whereby the 1971 distributions are standardized to the 1961 Census values. Since this method is somewhat more awkward, a brief description of the interpretation may be helpful.

Population shifts — One adjusts the 1971 constituent distributions to make the relative population shares the same as in 1961. The resulting distribution is what would have occurred in 1971 if there was no change in the distribution of the population by the selected characteristics between the 1961 and 1971 Censuses. The difference between the two distributions can be attributed to shifts in the distribution of the family population. For example, if the standardized distribution has higher income shares in the lower deciles, then one may conclude that in this respect the effect of the changed population distribution is reflected in an income distribution that is less equal. If the standardized distribution shows less income going to the lowest deciles than the observed distribution, then the effect has been equalizing.

Mean income shifts — The mechanics of the interpretation are identical.

4.4. Some Results

Tables 4.2 and 4.3 present standardized distributions and inequality measures for 1970 using backward standardizations for:

- (a) adjusting population as in 1961 Census;
- (b) adjusting mean income as in 1961 Census;
- (c) adjusting population and means as in 1961 Census.

(c) represents the effect of total between-class differences and (a) and (b) provide estimates of the effect of the two components that make up the change in (c) (although (a) and (b) do not add to (c)). By doing (a) and (b) separately, it is possible to isolate more precisely the important feature of the total between-class effect, i.e., whether the changes are influenced more by population than by income changes.

The third part of Table 4.2 summarizes the overall impact of holding between-class differences constant at the levels given by the 1961 Census. The change between the actual 1971 distribution and the distributions standardized to hold variables constant at their 1961 level can be attributed to between-class changes in the selected variable. The first and second parts of the table attempt to separate the total effects of between-class changes into changes due to population shifts and changes in the pattern of mean income by selected characteristics.

TABLE 4.2. Standardization of 1971 Restricted Census Family Income Distributions According to 1961 Population and Mean Incomes by Selected Characteristics

Selected characteristics	Decile class				
	Lowest	2nd	3rd	4th	5th
Actual distribution (1971)	0.1	1.7	3.0	5.0	7.1
Distributions standardized for population shifts by:					
Province	0.1	1.7	3.0	5.0	7.1
Rural/urban size.	0.1	1.7	3.0	4.9	7.1
Sex of head	0.1	1.7	3.1	5.1	7.2
Age of head	0.2	1.8	3.3	5.2	7.3
Education of head	0.1	1.8	3.1	5.0	7.2
Number of earners	0.1	1.7	3.1	5.0	7.1
Family size.	0.1	1.7	3.2	5.2	7.2
Distributions standardized for incomes by:					
Province	0.1	1.7	3.0	5.0	7.1
Rural/urban size.	0.1	1.7	3.0	4.9	7.1
Sex of head	0.1	1.7	3.1	5.0	7.2
Age of head	0.1	1.8	3.1	5.1	7.3
Education of head	0.1	1.6	2.9	4.8	6.8
Number of earners	0.1	1.7	3.1	5.1	7.3
Family size.	0.1	1.8	3.2	5.1	7.3
Distributions standardized for mean incomes and population shifts by:					
Province	0.1	1.7	3.0	5.0	7.1
Rural/urban size.	0.1	1.7	3.0	4.9	7.0
Sex of head	0.1	1.8	3.1	5.1	7.2
Age of head	0.2	1.9	3.4	5.3	7.4
Education of head	0.2	1.7	3.0	4.9	7.0
Number of earners	0.2	1.8	3.1	5.1	7.2
Family size.	0.2	1.9	3.3	5.3	7.4

TABLE 4.2. Standardization of 1971 Restricted Census Family Income Distributions According to 1961 Population and Mean Incomes by Selected Characteristics – Concluded

Selected characteristics	Decile class				
	6th	7th	8th	9th	Highest
Actual distribution (1971)	9.3	11.6	14.2	17.7	30.3
Distributions standardized for population shifts by:					
Province	9.3	11.6	14.2	17.8	30.3
Rural/urban size.	9.3	11.6	14.2	17.8	30.3
Sex of head	9.4	11.6	14.2	17.6	30.1
Age of head	9.5	11.6	14.1	17.4	29.7
Education of head	9.4	11.7	14.3	17.7	29.7
Number of earners	9.2	11.5	14.1	17.6	30.6
Family size.	9.4	11.6	14.1	17.5	29.9
Distributions standardized for incomes by:					
Province	9.3	11.6	14.2	17.7	30.3
Rural/urban size.	9.3	11.6	14.2	17.7	30.5
Sex of head	9.3	11.6	14.2	17.6	30.3
Age of head	9.4	11.6	14.1	17.5	29.9
Education of head	9.0	11.3	14.0	17.8	31.8
Number of earners	9.5	11.7	14.1	17.4	30.0
Family size.	9.4	11.6	14.1	17.5	29.9
Distributions standardized for mean incomes and population shifts by:					
Province	9.3	11.6	14.2	17.7	30.4
Rural/urban size.	9.2	11.6	14.2	17.8	30.6
Sex of head	9.4	11.6	14.1	17.5	30.0
Age of head	9.5	11.6	14.0	17.3	29.5
Education of head	9.1	11.4	14.0	17.7	31.1
Number of earners	9.3	11.6	14.0	17.3	30.4
Family size.	9.5	11.6	14.0	17.3	29.6

Source: Statistics Canada, 1961 and 1971 Censuses of Canada, unpublished data and computations by the author.

Generally, the standardized distributions suggest that changes in between-class relationships have resulted in a decline in the share of income accruing to the bottom deciles (since the standardized distribution has larger shares in the bottom deciles). However, at the top of the distribution (especially the top decile) there are situations where the between-class effect has been equalizing, thus causing crossing Lorenz curves.

The following table presents a summary of the distribution effects of the total between-class effects, population shifts and mean income shifts. Total between-class effects are disequalizing for sex of head, family size and age of head and are undetermined for the other variables. Population shifts result in almost no change in the income distribution for the geographic variables, and are disequalizing for all other variables except number of earners. Shifts in the pattern of mean income are disequalizing except for education of head for which the change is ambiguous and rural/urban size where there is essentially no change. The change in the mean income profile by education of head suggests a quite large equalizing impact in respect to the top decile's income share.

**Summary of Distributional Effects of Selected Standardizations,
Restricted Census Families, 1961 and 1971 Censuses of Canada**

	Total between-class effect	Population shifts	Mean income shifts
Province	?	U	D
Rural/urban size	?	U	U
Sex of head	D	D	D
Age of head	D	D	D
Education of head	?	D	?
Number of earners	?	?	D
Family size.	D	D	D

D = disequalizing

? = ambiguous change

U = almost no change (no share different by more than 0.1%).

Source: Table 4.2.

Table 4.3 summarizes the standardized results in terms of the three inequality measures. A lower standardized coefficient compared to the actual coefficient suggests that population and/or mean income shifts have been disequalizing, i.e., the changes have resulted in a rise in the coefficient of inequality and the opposite conclusion when the standardized coefficient is higher.

TABLE 4.3. Three Inequality Measures Standardized According to
1961 Population and Mean Incomes by Selected Characteristics

Selected characteristics	Inequality measure		
	Gini coefficient	T-B coefficient	Coefficient of variation
Actual measure (1971)	0.4721	0.4239	1.0060
Inequality standardized for population shifts by:			
Province	0.4727	0.4245	1.0074
Rural/urban size	0.4731	0.4248	1.0082
Sex of head	0.4679	0.4180	0.9965
Age of head	0.4596	0.4058	0.9779
Education of head	0.4651	0.4092	0.9852
Number of earners	0.4719	0.4258	1.0178
Family size	0.4646	0.4140	0.9893
Inequality standardized for mean income changes by:			
Province	0.4720	0.4182	1.0019
Rural/urban size	0.4738	0.4214	1.0077
Sex of head	0.4696	0.4122	0.9997
Age of head	0.4647	0.4008	0.9948
Education of head	0.4864	0.4431	1.0595
Number of earners	0.4666	0.4099	1.0098
Family size	0.4639	0.3996	0.9921
Inequality standardized for mean incomes and population by:			
Province	0.4727	0.4192	1.0036
Rural/urban size	0.4749	0.4228	1.0105
Sex of head	0.4657	0.4073	0.9907
Age of head	0.4538	0.3869	0.9718
Education of head	0.4769	0.4233	1.0320
Number of earners	0.4675	0.4147	1.0242
Family size	0.4568	0.3910	0.9773

Source: Statistics Canada, 1961 and 1971 Censuses of Canada, unpublished data and computations by the author.

Changes by family size and age and sex of head have had a disequalizing effect on the distribution for all inequality measures considered. For the rest of the variables different inequality measures give different conclusions. These situations arise because of the ambiguous changes in the underlying distributions (i.e., crossing Lorenz curves).

This represents as far as one can proceed legitimately with this exercise. Even this sketchy analysis demonstrates the extreme difficulty that one will have in attempting to make unambiguous statements about the effects of changing demographic structures and mean income profiles on income inequality.

A more detailed analysis would have attempted to apportion the inequality change between 1960 and 1970 to the selected variables in terms of their importance. This exercise requires strictly comparable data on income distributions for 1960 and 1970. The lack of comparability is described in Appendix A.

FOOTNOTES

¹ This does not mean that all income comparisons from the 1961 and 1971 Censuses are invalid. For example, it is doubtful that the problems discussed in Appendix A affect comparisons of average incomes by selected characteristics, an important distributional problem. It is comparisons of the distribution by size of income between 1961 and 1971 that is questioned.

² For further explanation, see Love and Wolfson, *Income Inequality: Statistical Methodology and Canadian Illustrations*, Catalogue 13-559.



CONCLUSION

The distribution of income among Canadian families is a very important concern but its generation is a complex phenomenon involving many interrelations and interactions. This paper has purposely avoided these problems in the hope of identifying and quantifying some of the main strands underlying the evolution of the distribution of family income.

From the analysis, it is difficult to give any firm or definitive conclusions but the following lists a number of the more important observations resulting from the analysis.

1. Chapter 1 demonstrated the very difficult problems of laying out a framework for analyzing inequality and the more important question concerning the distribution of welfare among the population. Although the development of income distribution data has progressed quite rapidly over the past 25 years, it has become apparent that the present data bases must be expanded to make valid inferences about changes in the distribution of well being. This is a very difficult challenge. Additionally, the state of economic theory about the distribution of income is not adequately developed so that guidelines for further improving the data base are not totally clear. At the present time, one must interpret the distribution of money income very carefully. Although an examination of its variation is intrinsically important, one must be careful making conclusions concerning the distribution of well being.
2. The distribution of income was examined in Chapter 2 from a variety of perspectives (especially by family size and different ordering principles) and in all instances a substantial degree of inequality remained. This suggests that the question of an unequal distribution of income is not a reflection of different needs for families of different size. Consequently, reasons for income differences require further examination.
3. In Chapter 3, the impact of a number of selected socio-economic characteristics on the distribution of family income is examined. It was found that a fairly large amount (68%) of family income differences was "explained" by these characteristics. Geographic characteristics were found to be relatively unimportant but socio-economic characteristics such as age, education, number of earners and work experience of the family head were fairly important variables related to income inequality. Unfortunately, the data suggest a high degree of collinearity between the selected variables, which makes it difficult to sort out independent effects of each variable.
4. Over the 1960 - 70 decade, demographic shifts and changes in mean income profiles have had a disequalizing effect on the distribution of income. This is especially true of age, sex and family size. Changes in the family population by

education of head, on the other hand, seem to have influenced the distribution in the opposite direction but crossing Lorenz curves prevent us from drawing this conclusion.

5. Finally, it is very difficult to use 1961 and 1971 Censuses data for this type of study because of the differences in procedures that have affected the data for comparing income decile. This is shown in Appendix A which shows the inconsistency between changes in income distribution from census data and other sources.

A further complication is the fact that the most important issue relating to the income distribution is the appropriate degree of inequality. Some inequalities are generally accepted, i.e., by family size. Others may or may not be justified depending on the underlying reasons for the situation, i.e., do some people choose to work less and consequently have lower incomes with a consequent higher level of inequality? This paper has not delved into this topic. It has only attempted to quantify the statistical relevance and importance of some of the main socio-economic variables in the income generation process. This is really only a starting point and much further analysis is required.

APPENDIX A

The main body of the analytic text is concerned with examining the source of inequality of family incomes in 1970. Of additional interest is an analysis of the factors underlying changes in inequality and the income distribution over a period between the 1961 and 1971 Censuses. The original interest of this monograph was to examine the effect of demographic changes on the distribution of income. This has become a topic of current interest due to increased emphasis on changes in the distribution of the national output rather than solely on the size of total output. It was originally planned to standardize 1961 income distributions for demographic changes in the population (for example by family size) between 1961 and 1971. However, it was found that the 1961 income distribution data were deemed inadequate for this analysis and consequently a standardization procedure based on the 1971 income distribution data became the second best options as described in Chapter 4.

As a prelude to examining this issue, a brief description of conceptual and coverage differences between the two censuses is presented. Comparisons between 1961 and 1971 Censuses data, unless adjusted for these differences, are always subject to the criticism that the data are not comparable. The following table shows that well over 10% of the population was excluded from the 1961 Census

TABLE A.1. Reconciliation of Population Aged 15 and Over
and Income Sample, Canada, 1961

Item	Population 15 years and over
Number in population	12,046,325
Excluded from 20% sample	1,892,572
Residents in Northwest Territories	13,771
Rural farm population	1,298,776
Inmates of institutions	142,882
Residents in collective households	290,306
Population not at permanent address	111,939
Urban farm population	34,898
Population sampled for income data ¹	10,153,753
Actual 20% sample estimates	10,101,172

¹ Includes overseas households and persons enumerated after the main enumeration was completed which were also excluded from the sample. Counts by age for these groups are not available but they probably account for most of the difference between this figure and the actual 20% sample estimates (1961 Census of Canada, Vol. IV.1, p. XVII, paragraph 1).

Source: Income of Canadians, 1961 Census monograph, p. 312.

sample but included in the 1971 Census sample; these were mostly farm residents (a census-farm household is situated in a holding of one acre or more with at least \$50 cash sales).

Besides these differences in coverage between 1961 and 1971 there was a difference in the income concept. In 1961 farm income was not included in the income concept. This is of minor consequence for the population covered in the 1961 Census since farm income was a minor source of income for non-farm households. The effect of the two adjustments (for coverage and income concept) on the 1971 Census data for the 10 provinces is summarized in the following table:¹

	Estimated number	Aggregate income
	thousands	millions of dollars
All individuals in 10 provinces	15,158	58,114
Excluding those residing in collective dwellings	14,711	56,830
Excluding those residing in collective dwellings and farms.	13,714	54,222
All economic families in 10 provinces	6,908	57,553
Excluding those residing in collective dwellings.	6,612	56,797
Excluding those residing in collective dwellings and farms.	6,243	54,189

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

To have comparability between the two data sources, about 10% of the population (whether individuals or families) and about 7% of the income must be excluded from the 1971 data base.

Table A.2 presents the decile distributions that result from 1961 and 1971 Censuses data after making the adjustments for comparability. These data suggest crossing Lorenz curves between the 1961 and 1971 Censuses. For income recipients the income shares for the first six deciles decrease, increase for the seventh through ninth deciles, and decline for the top decile. For economic families the decile shares decrease slightly up to four, increase for five through nine and decline 1.3 percentage points for the top decile. The measures of

See footnote(s) on page 99.

inequality move in all directions – for family units the Gini coefficient is unchanged to three decimal places, the coefficient of variation falls 20% and the T-B coefficient increases slightly from .312 - .317.

If one were to choose one significant change from the data, it would likely be the 1.3 percentage point decline in the share of income accruing to the top decile. Unfortunately, this change is not supported by other income distribution data. For example, the Survey of Consumer Finances (SCF) which collects identical income information to that of the census, and is available on a universe very similar to that of Table A.2 has income distribution data available for years adjacent to census years. These data appear in Table A.3 and indicate a very clear pattern towards greater inequality whether one looks at the distributions that show a consistent pattern towards disequalization of the distribution, or the inequality measure (only the Gini coefficient in this case is presented) for income recipients of families. The income share of the top decile of individuals, which declines 0.6 percentage points in census data, increases 3% - 4% in the Survey of Consumer Finances data. It is this difference that resulted in an evaluation of and comparison of the various data sources that finally led to the rejection of the distributional data from the 1961 Census. The next section presents the evidence that led to this decision.

TABLE A.2. Decile Shares and Inequality Summary for Income Recipients and Economic Family Units After Adjustments for Comparability, Canada, 1961 and 1971

Decile class	Income recipients		Economic family units	
	1960-61	1970	1960-61	1970
income share in per cent				
Lowest	0.6	0.4	1.0	0.9
2nd	1.9	1.8	3.0	2.8
3rd	3.0	2.9	4.9	4.6
4th	4.9	4.6	6.5	6.3
5th	7.1	6.8	7.8	8.0
6th	9.2	9.0	9.2	9.5
7th	11.3	11.4	10.7	11.2
8th	13.6	14.1	12.7	13.2
9th	16.7	17.6	15.7	16.2
Highest	31.9	31.3	28.5	27.2
Estimated number 000's	7,301	10,505	4,578	6,243
Mean income \$	3,131	5,162	5,003	8,680
Gini coefficient	0.472	0.477	0.399	0.399
Coefficient of variation	1.341	1.061	1.009	0.844
T-B coefficient	0.514	0.525	0.312	0.317

Source: Statistics Canada, 1961 and 1971 Censuses of Canada, unpublished data.

TABLE A.3. Decile Shares for Income Recipients and Economic Family Units from Surveys of Consumer Finances, Selected Years Adjacent to Census Years

Decile class	1959	1961	1969	1971
Income recipients ¹				
Lowest	1.0	0.9	0.4	1.4
2nd	2.4	2.2	1.8	0.4
3rd	3.6	3.5	2.9	2.8
4th	5.5	5.5	4.5	4.3
5th	7.6	7.6	6.8	6.6
6th	9.7	9.7	9.1	9.0
7th	11.8	11.9	11.6	11.6
8th	14.0	14.1	14.4	14.5
9th	16.8	17.1	17.9	18.1
Highest	27.6	27.5	30.6	31.1
Gini coefficient	0.421	0.427	0.474	0.483
Economic family units ¹				
Lowest	1.2	1.1	1.3	1.0
2nd	3.2	3.1	3.0	2.7
3rd	5.1	5.1	4.7	4.4
4th	6.8	6.9	6.5	6.3
5th	8.3	8.4	8.1	8.0
6th	9.7	9.9	9.6	9.7
7th	11.1	11.4	11.3	11.4
8th	13.0	13.2	13.3	13.4
9th	15.8	15.9	16.2	16.3
Highest	25.8	25.0	26.0	26.8
Gini coefficient	0.371	0.368	0.380	0.398

¹ Families and individuals whose major source of income comes from farming are excluded for this table.

Source: Statistics Canada, Surveys of Consumer Finances, 1960, 1962, 1970 and 1972, unpublished data.

A first reaction could be that census data, because of the large sample size, are more reliable than the survey data and so should be taken as "correct". Although, all other things being equal, census data should undoubtedly be more reliable it is unlikely that the survey data can be thrown out since they are based on sample sizes that are generally considered large (10,000 - 30,000 households). As well, the historical trend of the survey data is very consistent – not something

that one would expect from an unreliable data source in the sampling sense.² Consequently, non-sampling aspects require examination and there are several of these factors that could have had a bearing on the data, as Data Evaluation points out.

Data Evaluation

Data from 1961 and 1971 Censuses have been evaluated for internal consistency and with respect to outside sources such as National Accounts, National Revenue and the Survey of Consumer Finances. In both censuses certain problem areas of income reporting have been identified and documented.³ However, there has not been an evaluation or comparison of changes in the income distribution implied by the census data. In the main it has been argued that conceptual coverage differences between the 1961 and 1971 Censuses may obscure comparisons. The adjustments in Table A.2 don't satisfy this explanation so others must be sought.

After comparisons of census data with National Revenue and Survey of Consumer Finances data it became evident that the census trend was inconsistent with both the trend suggested by taxation and survey data and that the 1971 Census data were quite consistent with the 1961 SCF data around census year. These facts suggested that something about the 1961 Census should be questioned. There were a number of possibilities identified:

1. Processing errors where a number of cases of low income were key-punched as very high incomes, i.e., \$600,000 rather than \$600. In aggregate there was about \$100,000,000 in such income which would have the strongest effect on the top decile — about 0.3 - 0.5 percentage points.
2. A number of self-employed appear to have reported gross sales as wages and salaries (incorrectly) as well as net income from business or profession (in its correct location). An examination of individual records reveals cases where individuals reported no weeks worked for wages and salaries but both wages and salaries and self-employment income with the former being larger. This reporting error could have the effect of allocating a larger than proportionate share of income to the upper income groups although some experiments suggest that the possible impact of this may be minor.
3. Choice of reference period — There was a difference in the reference period for which income could be reported in the two censuses. This difference has been well known but its potential effect on the data has never been analyzed. In the 1961 Census individuals had the option of reporting for the 12 months previous to the census or for the previous calendar year. Loosely interpreted this may mean that even components could be reported for different time periods. In the 1971 Census there was no option — individuals were to report income for the previous calendar year only. The intent in 1961 was to obtain previous calendar year information if the previous 12-month data were not known. There are

See footnote(s) on page 99.

reasons to suspect that in cases where the previous 12 months was a period of low or zero income but there was an amount in the calendar year, then this was reported. Table A.4 represents ratios of income recipients to the population aged 14 and over (or 15 and over in the case of the census) estimated for a number of years from SCF data and census data. The breakdowns by sex provide two interesting contrasts between the survey and census data: (i) the census indicates a decline in the proportion of income recipients among males whereas the survey shows an increase; and (ii) the rate of increase for females is very much larger in the surveys than in the census. In addition, the 1971 Census results are quite compatible with the survey results but the 1961 Census results are much higher than the corresponding survey data. Given the reporting option in the 1961 Census it does not seem unreasonable to assume that the proportion income recipients is too high by about 5% for males and 10% for females in the 1961 Census.

TABLE A.4. Ratio of Income Recipients to Population

Income year	Census data ¹			Survey of Consumer Finances ²		
	Both sexes	Male	Female	Both sexes	Male	Female
1959						
1960	72.4	92.6	52.8	64.0	87.1	64.0
1961 . . . . .	..	..	..	63.9	85.7	63.9
1965 . . . . .	..	..	..	70.1	90.2	70.1
1967				68.1	90.1	68.1
1970	76.6 ³	90.73	62.93	73.2	90.0	73.2
1971 . . . . .	..	..	..

¹ The population base is the population aged 15 and over.

² The population base is the population aged 14 and over.

³ Excluding population residing in collective dwellings and farms (i.e., comparable to 1961 Census).

.. figures not available.

Source: Statistics Canada, unpublished data from the 1961 and 1971 Censuses of Canada and from Surveys of Consumer Finances, 1960, 1962, 1966, 1968, 1971 and 1972.

This would suggest that the general effect of this procedure has been to pick up what one can call phoney income recipients, i.e., persons who in the 12 months preceding the census had no income but had income in the previous calendar year.⁴ The problem is to determine the shape of the income distribution of these individuals so that the 1961 observed distribution could be adjusted for

See footnote(s) on page 99.

these inclusions. One can argue that there would be income recipients with very small amounts of income (i.e., wages for one or two weeks). Surprisingly, the effect of eliminating the phoney income recipients is to reduce the share of income accruing to the top decile. Table A.5 shows the results of adjusting the observed 1961 Census income distribution according to three assumptions about the income distribution of the phoney income recipients.

	Assumption 1		Assumption 2		Assumption 3	
	Male	Female	Male	Female	Male	Female
Under \$250	100,000	150,000	100,000	250,000	100,000	250,000
\$250 - \$499	50,000	100,000	75,000	100,000	75,000	150,000
500 - 749	50,000	50,000	75,000	50,000	75,000	100,000
Total	500,000		650,000		750,000	
Percentage of phoney income recipients	6.8		8.9		10.3	

The adjustment for phoney income recipients alone has resulted in a change in the distribution of income recipients to show a change in the share of income to the top decile increasing between 1961 and 1971 (Table A.5). The other two

TABLE A.5. Decile Shares Under Alternate Assumptions About the Distribution of "Phoney Income Recipients", 1961

Decile class	Actual	Income shares adjusted for distribution of "phoney" recipients according to		
		Assumption 1	Assumption 2	Assumption 3
Lowest	0.6	1.0	1.2	1.3
2nd	1.9	2.2	2.4	2.5
3rd	3.0	3.6	3.8	3.9
4th	4.9	5.5	5.6	5.7
5th	7.1	7.3	7.5	7.5
6th	9.2	9.3	9.2	9.2
7th	11.3	11.1	11.0	11.0
8th	13.6	13.1	13.0	12.9
9th	16.7	16.1	15.9	15.8
Highest	31.9	30.8	30.4	30.2

Source: Statistics Canada, 1961 Census of Canada, unpublished data and computations by the author.

changes discussed above would reinforce this movement. A 2% reduction in the share of income accruing to the top decile is not unreasonable and puts the 1961 - 71 Census data change in line with Survey of Consumer Finances and National Revenue data.

Although this example demonstrates the possible extent of the problem at the national level for income recipients, the information required to do the adjustment by characteristics such as region, age, sex, etc., is not available. More importantly the example does not give any insight into the effect on the distribution of family income. This requires detailed information on the family characteristics and the distribution of the phoney income recipients by income class — the nature of their characteristics is only subject to hazardous speculation as the required data do not exist.

FOOTNOTES

¹ In fact, a processing error has resulted in some family units being erroneously included in the above data. However, these inclusions are a very small percentage of the population and will not affect the general results of this section.

The improper inclusions constitute a very small percentage of households (approximately 0.2% of the total) and are mainly late random additions and families in overseas households. Because of the small size of this group they could only have an impact on the income distribution if their distribution was radically different from that of the proper inclusions. Some investigations by the author suggest that the income distribution of this group is not radically different from the proper inclusions.

² Further, data from the National Revenue files indicate the same trend as the Survey of Consumer Finances.

³ For these comparisons and evaluations, see "Incomes of Canadians", a 1961 Monograph by Jenny Podoluk and "An Evaluation of Income data from the 1971 Census of Canada", census research memorandum 71 - EC - 5 by A. Rashid.

⁴ It may also be reasonable to argue that the option leads individuals to report the higher income period, which would distort the upper income share further.

APPENDIX B

APPENDIX TABLES TO CHAPTER 2

TABLE B.1. Decile Distributions and Inequality Measures of Economic Family Units by Size, Canada, 1971

Decile class (1970 income)	Economic family units	Family unit size				
		1 person	2 persons	3 persons	4 persons	5 persons or more
income share in per cent						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Lowest	0.6	- 0.1	1.4	1.6	1.9	1.8
2nd	2.4	2.2	3.4	4.2	4.7	4.4
3rd	4.2	3.4	4.6	5.8	6.2	5.9
4th	6.1	4.1	6.3	7.2	7.3	7.0
5th	7.8	5.8	7.9	8.4	8.4	8.1
6th	9.5	8.4	9.5	9.6	9.5	9.3
7th	11.3	11.2	11.2	11.0	10.7	10.6
8th	13.5	14.4	13.3	12.7	12.3	12.4
9th	16.6	18.6	16.0	15.2	14.8	15.1
Highest	28.0	32.2	26.4	24.4	24.4	25.5
Average income \$	8,332	3,852	8,234	9,627	10,668	11,267
Median income \$	7,218	2,715	7,155	8,635	9,487	9,784
Estimated number 000's	6,908	1,805	1,507	1,026	1,056	1,513
Gini coefficient	0.418	0.495	0.382	0.337	0.322	0.340
T-B coefficient	0.336	0.389	0.275	0.228	0.200	0.213
Coefficient of variation	0.881	1.098	0.830	0.717	0.706	0.737

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE B.2. Decile Distributions and Inequality Measures of Census Family Units by Size, Canada, 1971

Decile class (1970 income)	Census family units	Family unit size				
		1 person	2 persons	3 persons	4 persons	5 persons or more
income share in per cent						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Lowest	0.4	- 0.2	1.3	1.5	1.9	1.7
2nd	2.1	1.9	3.3	4.1	4.6	4.3
3rd	3.8	3.5	4.6	5.8	6.2	5.8
4th	5.7	4.0	6.2	7.2	7.3	7.0
5th	7.6	5.4	7.9	8.4	8.4	8.1
6th	9.5	8.0	9.5	9.6	9.5	9.3
7th	11.4	11.0	11.3	11.0	10.7	10.6
8th	13.7	14.5	13.3	12.7	12.3	12.3
9th	17.0	19.0	16.1	15.2	14.7	15.0
Highest	28.9	32.8	26.6	24.6	24.5	25.9
Average income \$	7,640	3,617	8,112	9,417	10,442	10,813
Median income \$	6,556	2,411	7,053	8,458	9,292	9,386
Estimated number 000's	7,535	2,469	1,589	1,042	1,059	1,375
Gini coefficient	0.439	0.505	0.386	0.340	0.323	0.345
T-B coefficient	0.366	0.393	0.286	0.238	0.204	0.219
Coefficient of variation	0.929	1.126	0.838	0.727	0.713	0.755

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE B.3. Decile Distributions and Inequality Measures of Restricted Census Family Units by Size, Canada, 1971

Decile group (1970 income)	Restricted census family units	Family unit size				
		1 person	2 persons	3 persons	4 persons	5 persons or more
income share in per cent						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Lowest	- 0.1	- 0.2	1.3	1.4	1.8	1.6
2nd	1.6	0.6	3.2	4.0	4.6	4.3
3rd	2.8	2.7	4.5	5.8	6.3	5.8
4th	4.7	4.1	6.2	7.3	7.5	7.1
5th	6.8	5.2	7.8	8.5	8.5	8.3
6th	9.1	7.6	9.4	9.7	9.6	9.4
7th	11.6	11.0	11.2	11.0	10.7	10.6
8th	14.3	14.8	13.2	12.6	12.2	12.1
9th	18.0	19.8	16.0	15.0	14.5	14.6
Highest	31.1	34.5	27.3	24.7	24.2	26.1
Average income . . . \$	6,271	3,085	8,378	8,992	9,700	9,666
Median income . . . \$	5,033	1,934	7,209	8,149	8,781	8,497
Estimated number . . . 000's	9,179	4,275	1,871	964	955	1,113
Gini coefficient	0.486	0.541	0.392	0.341	0.319	0.345
T-B coefficient	0.434	0.442	0.294	0.244	0.203	0.221
Coefficient of variation	1.039	1.196	0.866	0.741	0.707	0.777

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE B.4. Distributions and Inequality Measures of Income Recipients and Individuals 15 Years of Age and Over by Sex, Canada, 1971

Decile class (1970 income)	Both sexes		Male		Female	
	Indi- viduals	Income recipients	Indi- viduals	Income recipients	Indi- viduals	Income recipients
income share in per cent						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Lowest	- 0.3	0.5	- 0.1	0.4	- 0.3	0.3
2nd	1.0	2.2	0.0	1.8	0.0	1.8
3rd	2.8	4.0	0.0	3.4	0.3	2.9
4th	5.1	6.1	0.2	4.5	2.3	4.5
5th	7.6	8.0	2.1	5.8	4.3	6.6
6th	9.8	9.7	6.1	8.3	7.5	8.9
7th	11.9	11.4	9.2	11.3	11.4	11.3
8th	14.1	13.3	15.6	14.5	15.7	14.2
9th	17.2	16.1	23.9	18.7	20.9	17.8
Highest	30.9	28.9	43.2	31.2	37.9	31.8
Average income . . . \$	5,902	6,538	1,796	2,883	3,834	5,032
Median income . . . \$	5,166	5,809	765	2,036	2,183	3,930
Estimated number . . . 000's	7,523	6,792	7,634	4,757	15,158	11,548
Gini coefficient	0.483	0.427	0.679	0.484	0.609	0.486
T-B coefficient	0.405	0.405	0.522	0.522	0.530	0.530
Coefficient of variation	1.052	0.950	1.542	1.051	1.361	1.083

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE B.5. Decile Distributions and Inequality Measures of Individuals Ranked by Per Capita Income and Economic Family Units Ranked by Per Capita Income and Welfare Ratio, Canada, 1971

Decile class (1970 income)	Individuals ranked by per capita ¹ income	Economic family units	
		Ranked by per capita ¹ income	Ranked by welfare ratio ¹
income share in per cent			
Total	100.0	100.0	100.0
Lowest	1.2	0.9	1.0
2nd	3.4	3.2	3.3
3rd	4.8	4.4	4.9
4th	5.9	5.5	6.5
5th	7.2	6.9	7.9
6th	8.6	8.4	9.4
7th	10.3	10.4	11.0
8th	12.6	13.0	13.1
9th	16.4	17.1	16.1
Highest	29.6	30.2	26.9
Average income . . . \$	2,700	3,214	1,945
Median income . . . \$	2,111	2,449	1,675
Estimated number . . . 000's	21,315	6,908	6,908
Gini coefficient	0.410	0.429	0.388
T-B coefficient	0.300	0.317	0.267
Coefficient of variation	0.866	0.879	0.814

¹ See Chapter 2 for an explanation of the different principles.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

APPENDIX C

APPENDIX TABLES TO CHAPTER 3

TABLE C.1. Decile Cut-offs and Income Shares for Economic Family Units
by Province of Residence, Canada, 1971

No.	Province of residence	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	Newfoundland . . . . .	...	1,372	2,358	3,251	
2	Prince Edward Island. . . . .	...	1,347	2,201	3,080	
3	Nova Scotia . . . . .	...	1,384	2,525	3,629	
4	New Brunswick. . . . .	...	1,361	2,495	3,535	
5	Quebec . . . . .	...	1,375	2,749	4,243	
6	Ontario . . . . .	...	1,583	3,392	5,181	
7	Manitoba . . . . .	...	1,295	2,252	3,483	
8	Saskatchewan. . . . .	...	1,056	1,745	2,710	
9	Alberta . . . . .	...	1,329	2,517	3,903	
10	British Columbia . . . . .	...	1,426	2,739	4,290	
Income share							
per cent							
11	Newfoundland	100.00	1.02	2.75	4.26		
12	Prince Edward Island	100.00	2.62	2.65	4.19		
13	Nova Scotia	100.00	1.06	2.66	4.34		
14	New Brunswick.	100.00	1.38	2.71	4.39		
15	Quebec	100.00	0.70	2.46	4.35		
16	Ontario	100.00	1.01	2.66	4.61		
17	Manitoba	100.00	6.50	2.13	3.65		
18	Saskatchewan.	100.00	0.18	2.22	3.58		
19	Alberta	100.00	0.71	2.24	3.94		
20	British Columbia	100.00	0.76	2.38	4.14		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

**TABLE C.1. Decile Cut-offs and Income Shares for Economic Family Units
by Province of Residence, Canada, 1971**

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
4,285	5,393	6,644	8,071	9,801	12,658		1	
4,042	5,044	6,258	7,618	9,274	12,079		2	
4,818	6,034	7,222	8,576	10,422	13,382		3	
4,682	5,901	7,114	8,362	10,072	12,819		4	
5,607	6,930	8,218	9,786	11,834	15,346		5	
6,789	8,209	9,698	11,328	13,500	17,065	1	6	
4,859	6,309	7,758	9,261	11,134	14,238		7	
3,732	5,011	6,462	8,017	9,883	12,763		8	
5,383	6,967	8,421	10,068	12,074	15,458		9	
6,022	7,457	8,876	10,407	12,372	15,749		10	
Income share								
per cent								
5.74	7.37	9.12	11.14	13.50	16.83	28.27	11	
5.58	7.10	8.87	10.91	13.19	16.52	28.36	12	
5.97	7.66	9.38	11.16	13.38	16.60	27.80	13	
6.01	7.73	9.54	11.30	13.45	16.53	26.97	14	
6.13	7.76	9.37	11.12	13.30	16.58	28.24	15	
6.42	8.05	9.59	11.24	13.22	16.12	27.07	16	
5.29	7.11	8.98	10.84	12.97	15.95	26.58	17	
5.10	6.94	9.10	11.50	14.21	17.86	29.66	18	
5.72	7.64	9.51	11.41	13.60	16.73	28.52	19	
6.11	8.00	9.70	11.43	13.48	16.47	27.53	20	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.2. Decile Cut-offs and Income Shares for Economic Family Units
by Rural/Urban Size, Canada, 1971

No.	Rural/urban size	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	Rural non-farm . . . . .	...	1,323	2,222	3,220	
2	Rural farm . . . . .	...	801	1,920	2,856	
3	500,000 and over . . . . .	...	1,489	3,240	5,027	
4	100,000-499,999 . . . . .	...	1,490	3,194	4,948	
5	30,000- 99,999 . . . . .	...	1,438	3,024	4,693	
6	10,000- 29,999 . . . . .	...	1,437	2,998	4,681	
7	5,000- 9,999 . . . . .	...	1,438	2,887	4,433	
8	2,500- 4,999 . . . . .	...	1,438	2,667	4,029	
9	1,000- 2,499 . . . . .	...	1,368	2,406	3,583	
Income share							
per cent							
10	Rural non-farm	100.00	0.75	2.51	4.10		
11	Rural farm	100.00	0.43	2.12	3.70		
12	500,000 and over	100.00	0.77	2.50	4.44		
13	100,000-499,999	100.00	0.92	2.60	4.56		
14	30,000- 99,999	100.00	1.94	2.54	4.50		
15	10,000- 29,999	100.00	1.95	2.55	4.52		
16	5,000- 9,999	100.00	1.98	2.57	4.48		
17	2,500- 4,999	100.00	1.76	2.55	4.26		
18	1,000- 2,499	100.00	0.91	2.48	4.16		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

**TABLE C.2. Decile Cut-offs and Income Shares for Economic Family Units
by Rural/Urban Size, Canada, 1971**

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
4,409	5,651	6,963	8,307	10,081	12,898		1	
3,775	4,826	6,065	7,579	9,733	13,540		2	
6,573	8,032	9,547	11,253	13,576	17,465		3	
6,555	7,945	9,319	10,877	12,905	16,275	1	4	
6,229	7,600	8,938	10,427	12,285	15,506		5	
6,225	7,577	8,906	10,363	12,239	15,341		6	
5,973	7,282	8,562	10,024	11,763	14,757		7	
5,418	6,802	8,138	9,593	11,453	14,490		8	
4,971	6,230	7,544	8,976	10,692	13,607		9	
Income share								
per cent								
5.72	7.53	9.43	11.41	13.71	16.96	27.88	10	
5.11	6.64	8.39	10.50	13.28	17.64	33.04	11	
6.18	7.79	9.38	11.12	13.23	16.34	28.24	12	
6.45	8.13	9.69	11.34	13.30	16.18	26.83	13	
6.43	8.14	9.69	11.33	13.27	16.07	26.09	14	
6.49	8.21	9.77	11.41	13.34	16.17	25.59	15	
6.41	8.18	9.77	11.43	13.32	16.13	25.73	16	
6.08	7.86	9.60	11.35	13.44	16.44	26.65	17	
5.96	7.84	9.65	11.53	13.67	16.76	27.04	18	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.3. Decile Cut-offs and Income Shares for Economic Family Units
by Sex of Head, Canada, 1971

No.	Sex of head	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	Male . . . . .	...	2,252	4,057	5,648	
2	Female . . . . .	...	479	1,270	1,510	
Income share							
per cent							
3	Male	100.00	0.97	3.36	5.18		
4	Female	100.00	1.33	2.28	3.20		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.3. Decile Cut-offs and Income Shares for Economic Family Units by Sex of Head, Canada, 1971

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
7,055	8,276	9,633	11,150	13,189	16,715		1	
2,123	3,004	3,956	5,065	6,566	9,115		2	
Income share								
per cent								
6.78	8.16	9.53	11.04	12.90	15.70	26.40	3	
4.19	5.96	8.14	10.55	13.54	18.06	32.75	4	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.4. Decile Cut-offs and Income Shares for Economic Family Units
by Age of Head, Canada, 1971

No.	Age of head	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	15-24 years. . . . .	...	168	1,128	2,165	
2	25-34 " . . . . .	...	2,692	4,620	6,023	
3	35-44 " . . . . .	...	3,001	5,049	6,584	
4	45-54 " . . . . .	...	2,464	4,604	6,320	
5	55-64 " . . . . .	...	1,279	2,817	4,352	
6	65-69 " . . . . .	...	1,326	1,707	2,534	
7	70 years and over. . . . .	...	1,301	1,434	1,680	
Income share							
per cent							
8	15-24 years.	100.00	-0.04	1.37	3.36		
9	25-34 "	100.00	1.64	4.28	6.13		
10	35-44 "	100.00	2.03	4.02	5.75		
11	45-54 "	100.00	1.32	3.36	5.14		
12	55-64 "	100.00	0.98	2.26	4.03		
13	65-69 "	100.00	2.83	2.22	3.21		
14	70 years and over.	100.00	2.52	2.91	3.19		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.4. Decile Cut-offs and Income Shares for Economic Family Units
by Age of Head, Canada, 1971

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
3,235	4,231	5,248	6,512	7,959	10,070		1	
7,118	8,136	9,218	10,472	12,071	14,519		2	
7,842	9,026	10,252	11,738	13,695	17,094		3	
7,826	9,265	10,812	12,641	15,071	19,115		4	
5,851	7,254	8,807	10,643	13,111	17,313		5	
3,380	4,474	5,772	7,336	9,503	13,377		6	
2,271	2,810	3,481	4,632	6,544	10,002		7	
Income share								
per cent								
5.61	7.81	9.89	12.18	14.90	18.51	26.41	8	
7.58	8.78	9.99	11.33	12.93	15.16	22.17	9	
7.13	8.32	9.53	10.83	12.50	15.00	24.89	10	
6.64	8.00	9.41	10.97	12.92	15.78	26.47	11	
5.73	7.36	9.01	10.89	13.23	16.80	29.71	12	
4.49	5.98	7.81	9.99	12.78	17.12	33.56	13	
4.12	5.57	6.68	8.65	11.83	17.32	37.21	14	

¹ Open-ended class.

. . . figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.5. Decile Cut-offs and Income Shares for Economic Family Units
by Education of Head, Canada, 1971

No.	Education of head	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	No schooling . . . . .	...	98	1,315	1,705	
2	Kindergarten . . . . .	...	-	462	1,258	
Elementary:							
3	1-4 . . . . .	...	1,118	1,478	2,196	
4	5 or more . . . . .	...	1,349	2,308	3,469	
High school:							
5	1 . . . . .	...	1,480	3,082	4,547	
6	2 . . . . .	...	1,631	3,415	5,029	
7	3 . . . . .	...	1,736	3,737	5,278	
8	4 . . . . .	...	1,635	3,656	5,242	
9	5 . . . . .	...	1,732	3,942	5,782	
University:							
10	1 and 2 . . . . .	...	1,830	4,053	5,853	
11	3 . . . . .	...	1,496	3,121	5,142	
12	4 or more . . . . .	...	1,459	3,075	4,769	
13	Degree . . . . .	...	3,206	6,366	8,770	
Income share							
per cent							
14	No schooling	100.00	- 0.19	1.53	2.38		
15	Kindergarten	100.00	- 0.32	4.82	1.95		
Elementary:							
16	1-4	100.00	0.68	2.38	3.21		
17	5 or more	100.00	0.80	2.46	4.11		
High school:							
18	1	100.00	2.94	2.83	4.75		
19	2	100.00	1.39	3.04	5.04		
20	3	100.00	0.91	3.18	5.19		
21	4	100.00	1.41	3.01	5.03		
22	5	100.00	0.83	2.82	4.88		
University:							
23	1 and 2	100.00	0.72	2.99	5.05		
24	3	100.00	3.86	2.25	4.14		
25	4 or more	100.00	1.52	2.47	4.31		
26	Degree	100.00	0.92	3.23	5.12		

1 Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

**TABLE C.5. Decile Cut-offs and Income Shares for Economic Family Units
by Education of Head, Canada, 1971**

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
2,660 1,537	3,783 2,484	5,533 3,783	7,543 5,032	10,083 6,618	13,956 9,373		1 2	
2,973 4,769	3,990 6,075	5,248 7,339	6,805 8,747	8,725 10,583	11,914 13,595		3 4	
5,936 6,425 6,727 6,763 7,384	7,151 7,670 8,023 8,132 9,000	8,331 8,950 9,270 9,458 10,539	9,709 10,304 10,701 10,907 12,194	11,452 12,078 12,495 12,725 14,333	14,292 14,951 15,517 15,737 17,941	1	5 6 7 8 9	
7,342 6,836 6,219 10,737	8,793 8,362 7,730 12,646	10,248 10,018 9,199 14,658	11,912 11,783 10,941 17,007	14,002 14,082 13,066 20,378	17,623 18,062 16,679 27,639		10 11 12 13	
Income share								
per cent								
3.63 2.89	5.23 4.06	7.66 6.59	10.83 9.18	14.50 12.12	19.60 16.79	34.82 31.91	14 15	
4.69 5.86	6.20 7.73	8.30 9.57	10.86 11.45	13.93 13.72	18.32 16.97	31.42 27.33	16 17	
6.54 6.81 6.89 6.78 6.59	8.18 8.42 8.43 8.40 8.19	9.66 9.91 9.87 9.89 9.75	11.24 11.48 11.42 11.45 11.34	13.12 13.31 13.22 13.26 13.21	15.85 15.92 15.82 15.85 15.91	24.89 24.66 25.06 24.93 26.47	18 19 20 21 22	
6.72 5.99 6.09 6.57	8.22 7.64 7.76 7.88	9.72 9.19 9.37 9.17	11.26 10.87 11.16 10.60	13.11 12.89 13.25 12.48	15.86 15.83 16.24 15.79	26.36 27.36 27.83 28.23	23 24 25 26	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.6. Decile Cut-offs and Income Shares for Economic Family Units
by Work Experience of Head, Canada, 1971

No.	Work experience of head	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	Full time . . . . .	...	4,233	5,969	7,196	
2	Part time . . . . .	...	1,511	2,717	3,814	
3	Did not work . . . . .	...	38	1,118	1,393	
Income share							
per cent							
4	Full time	100.00	2.24	4.79	6.14		
5	Part time	100.00	2.06	2.86	4.41		
6	Did not work	100.00	- 0.12	1.85	3.57		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

**TABLE C.6. Decile Cut-offs and Income Shares for Economic Family Units
by Work Experience of Head, Canada, 1971**

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
8,314	9,485	10,717	12,213	14,239	17,834		1	
4,919	6,055	7,249	8,691	10,589	13,816	1	2	
1,662	2,279	2,908	3,792	5,333	8,438		3	
Income share								
per cent								
7.23	8.28	9.40	10.66	12.26	14.71	24.30	4	
5.87	7.37	8.96	10.75	12.96	16.21	28.54	5	
3.98	5.23	7.14	8.99	12.26	18.27	38.84	6	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.7. Decile Cut-offs and Income Shares for Economic Family Units
by Number of Earners in Family Unit, Canada, 1971

No.	Number of earners in family unit	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	None . . . . .	...	-	750	1,267	
2	One . . . . .	...	1,918	3,225	4,323	
3	Two . . . . .	...	5,034	6,779	8,056	
4	Three or more . . . . .	...	7,367	9,443	10,982	
Income share							
per cent							
5	None	100.00	- 0.01	0.75	4.43		
6	One	100.00	1.26	3.52	5.16		
7	Two	100.00	3.58	5.34	6.66		
8	Three or more	100.00	4.42	5.55	6.69		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.7. Decile Cut-offs and Income Shares for Economic Family Units
by Number of Earners in Family Unit, Canada, 1971

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
1,406	1,610	2,073	2,681	3,347	4,832		1	
5,331	6,368	7,365	8,505	10,075	12,785	1	2	
9,140	10,181	11,278	12,546	14,201	17,115		3	
12,363	13,736	15,219	16,954	19,316	23,507		4	
Income share								
per cent								
5.60	5.95	7.40	10.01	12.32	16.46	37.08	5	
6.59	7.95	9.34	10.76	12.57	15.22	27.63	6	
7.70	8.64	9.59	10.64	11.92	13.84	22.08	7	
7.64	8.53	9.46	10.50	11.81	13.86	21.54	8	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C.8. Decile Cut-offs and Income Shares for Economic Family Units
by Major Source of Income, Canada, 1971

No.	Major source of income	Total	Decile class (1970 income)		
			Lowest	2nd	3rd
			Decile cut-off		
dollars					
1	Wages and salaries . . . . .	...	3,302	5,038	6,324
2	Non-farm self-employment . . .	...	2,161	3,678	5,010
3	Farm self-employment . . . . .	...	896	1,273	1,384
4	Government transfer payments	...	1,458	2,347	3,023
5	Investment income . . . . .	...	1,905	2,593	3,218
6	Other income . . . . .	...	116	1,495	2,391
Income share					
per cent					
7	Wages and salaries	100.00	1.98	4.37	5.88
8	Non-farm self-employment . . .	100.00	10.72	2.27	3.31
9	Farm self-employment	100.00	10.25	4.58	5.46
10	Government transfer payments	100.00	1.72	2.44	3.25
11	Investment income	100.00	1.94	3.36	4.29
12	Other income	100.00	- 6.32	1.68	3.69

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

**TABLE C.8. Decile Cut-offs and Income Shares for Economic Family Units
by Major Source of Income, Canada, 1971**

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
7,487	8,630	9,900	11,321	13,233	16,530		1	
6,287	7,808	9,624	12,110	16,158	25,699		2	
1,494	1,739	2,194	2,685	3,207	4,187	1	3	
3,837	4,773	5,947	7,667	10,537	16,906		4	
3,914	4,649	5,507	6,672	8,479	12,745		5	
3,179	4,019	4,983	6,258	8,204	12,029		6	
Income share								
per cent								
7.16	8.35	9.58	10.94	12.67	15.21	23.85	7	
4.31	5.39	6.65	8.26	10.68	15.42	32.97	8	
5.46	6.45	7.80	10.01	11.78	14.65	23.57	9	
4.16	5.21	6.48	8.21	10.87	16.04	41.62	10	
5.27	6.32	7.48	8.97	11.05	15.17	36.14	11	
5.23	6.69	8.36	10.45	13.40	18.42	38.41	12	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census of Canada, unpublished data.

TABLE C. 9. Decile Cut-offs and Income Shares for Economic Family Units
by Size, Canada, 1971

No.	Family unit size	Total	Decile class (1970 income)				
			Lowest	2nd	3rd		
Decile cut-off							
dollars							
1	1 person . . . . .	...	276	1,160	1,433	
2	2 persons . . . . .	...	2,271	3,208	4,505	
3	3 " . . . . .	...	3,077	4,902	6,267	
4	4 " . . . . .	...	3,939	5,905	7,228	
5	5 " . . . . .	...	4,087	6,106	7,495	
6	6 " . . . . .	...	4,018	5,931	7,407	
7	7 " . . . . .	...	3,802	5,547	7,043	
8	8 " . . . . .	...	3,710	5,284	6,709	
9	9 " . . . . .	...	3,536	5,045	6,412	
10	10 persons or more . . . . .	...	3,562	4,968	6,173	
Income share							
per cent							
11	1 person	100.00	- 0.10	2.15	3.41		
12	2 persons	100.00	2.15	3.32	4.61		
13	3 "	100.00	2.26	4.14	5.78		
14	4 "	100.00	2.20	4.66	6.17		
15	5 "	100.00	2.83	4.53	6.00		
16	6 "	100.00	2.73	4.33	5.80		
17	7 "	100.00	2.25	4.16	5.58		
18	8 "	100.00	1.77	4.12	5.46		
19	9 "	100.00	2.14	4.00	5.30		
20	10 persons or more	100.00	2.50	4.03	5.22		

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Special tabulations, 1971 Census of Canada.

TABLE C. 9. Decile Cut-offs and Income Shares for Economic Family Units
by Size, Canada, 1971

Decile class (1970 income)							No.	
4th	5th	6th	7th	8th	9th	Highest		
Decile cut-off								
dollars								
1,851	2,715	3,764	4,944	6,246	8,274		1	
5,846	7,155	8,515	10,058	11,940	14,862		2	
7,474	8,635	9,907	11,335	13,209	16,395		3	
8,344	9,487	10,684	12,158	14,193	17,758		4	
8,685	9,920	11,191	12,797	15,061	19,058	1	5	
8,647	9,916	11,281	12,971	15,414	19,676		6	
8,363	9,640	11,091	12,924	15,456	19,749		7	
8,024	9,337	10,746	12,573	15,077	19,395		8	
7,706	9,043	10,584	12,373	14,966	19,510		9	
7,476	8,821	10,432	12,245	15,003	19,537		10	
Income share								
per cent								
4.05	5.79	8.35	11.18	14.36	18.64	32.16	11	
6.23	7.82	9.41	11.15	13.15	15.91	26.23	12	
7.10	8.31	9.54	10.91	12.61	15.08	24.28	13	
7.30	8.33	9.42	10.65	12.25	14.71	24.31	14	
7.12	8.16	9.23	10.49	12.14	14.71	24.80	15	
6.94	8.02	9.13	10.44	12.19	14.91	25.52	16	
6.82	7.95	9.16	10.59	12.47	15.30	25.71	17	
6.71	7.89	9.14	10.60	12.52	15.44	26.35	18	
6.53	7.76	9.09	10.57	12.59	15.71	26.31	19	
6.38	7.62	8.95	10.55	12.66	15.89	26.19	20	

¹ Open-ended class.

... figures not appropriate or not applicable.

Source: Special tabulations, 1971 Census of Canada.

BIBLIOGRAPHY

Aigner, D.J. and Heins, A.J. 1967. A Social Welfare View of the Measurement of Income Inequality. *Review of Income and Wealth* 13: pp. 175-184.

Atkinson, A.B. 1970. *The Economics of Inequality*. London: Oxford University Press.

Atkinson, A.B. 1970. On the Measurement of Inequality. *Journal of Economic Theory* 2: pp. 224-263.

Bowman, M.J. 1945. A Graphical Analysis of Personal Income Distribution in the United States. *American Economic Review* 35: pp. 607-628.

Canada. Statistics Canada. 1960-1972 *Income Distributions by Size in Canada*. Catalogue 13-207, Annual, Ottawa.

Canada. Statistics Canada. 1977. *1971 Census of Canada, Families, Introduction to Vol. II (Part 2)*. Bulletin 2.2 - 1, Catalogue 93-713. Ottawa: The Minister of Industry, Trade and Commerce.

Dalton, H. 1920. The Measurement of the Inequality of Incomes. *Economic Journal* 30: pp. 348-361.

Love, Roger and Wolfson, Michael C. 1976. *Income Inequality: Statistical Methodology and Canadian Illustrations*. Catalogue 13-559. Ottawa: Information Canada.

Pen, J. 1974. *Income Distribution, 2nd Edition*. Penguin, Harmondsworth.

Podoluk, J.R. 1968. *Incomes of Canadians*. Ottawa: Queen's Printer.

Sen, A.K. 1973. *On Economic Inequality*. London: Oxford University Press.

Simon, H. 1938. *Personal Income Taxation*. Chicago: University of Chicago Press.

Theil, H. 1967. *Economics and Information Theory*. North Holland, Amsterdam.

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